

FILE COPY

STATE OF UTAH
DIVISION OF WATER QUALITY
DEPARTMENT OF ENVIRONMENTAL QUALITY
SALT LAKE CITY, UTAH

AUTHORIZATION TO DISCHARGE UNDER THE
UTAH POLLUTANT DISCHARGE ELIMINATION SYSTEM
(UPDES)

In compliance with provisions of the *Utah Water Quality Act, Title 19, Chapter 5, Utah Code Annotated ("UCA") 1953, as amended (the "Act")*,

GOLDEN STATE OPERATING, LLC– Ashley Valley Facility

Is hereby authorized to discharge from its facility located in the Ashley Valley Oil Field near Jensen in Uintah County, Utah, with Outfall 001 located at latitude N 40.366969° and longitude -109.414831°, and Outfall 002 located at latitude N 40.367133° and longitude -109.414844.
to receiving waters named

Un-named ditch to Union Irrigation Canal and Ashley Creek to the Green River.

In accordance with discharge point, effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective on October 1, 2015.

This permit and the authorization to discharge shall expire at midnight, September 30, 2020.

Signed this 11th day of September, 2015.



Walter L. Baker, P.E.
Director

TABLE OF CONTENTS

Page No.

I.	EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS	1
A.	Definitions.....	1
B.	Description of Discharge Point.	2
C.	Narrative Standard.	3
D.	Specific Limitations and Self-Monitoring Requirements.	3
II.	MONITORING, RECORDING AND REPORTING REQUIREMENTS	7
A.	Representative Sampling	7
B.	Monitoring Procedures.....	7
C.	Penalties for Tampering.	7
D.	Reporting of Monitoring Results.....	7
E.	Compliance Schedules.	7
F.	Additional Monitoring by the Permittee.	7
G.	Records Contents.	7
H.	Retention of Records.....	8
I.	Twenty-four Hour Notice of Noncompliance Reporting.	8
J.	Other Noncompliance Reporting.	9
K.	Inspection and Entry.	9
III.	COMPLIANCE RESPONSIBILITIES	10
A.	Duty to Comply.	10
B.	Penalties for Violations of Permit Conditions.....	10
C.	Need to Halt or Reduce Activity not a Defense.	10
D.	Duty to Mitigate.	10
E.	Proper Operation and Maintenance.....	10
F.	Removed Substances.....	10
G.	Bypass of Treatment Facilities.	10
H.	Upset Conditions.	12
I.	Toxic Pollutants.	12
J.	Changes in Discharge of Toxic Substances.	12
K.	Industrial Pretreatment.	13
IV.	GENERAL REQUIREMENTS	14
A.	Planned Changes.	14
B.	Anticipated Noncompliance.....	14
C.	Permit Actions.....	14
D.	Duty to Reapply.	14
E.	Duty to Provide Information.	14
F.	Other Information.....	14
G.	Signatory Requirements.	14
H.	Penalties for Falsification of Reports.	15
I.	Availability of Reports.	15
J.	Oil and Hazardous Substance Liability.....	15
K.	Property Rights.....	16
L.	Severability.	16
M.	Transfers.....	16
N.	State Laws.	16
O.	Water Quality-Reopener Provision.	16
P.	Toxicity Limitation - Reopener Provision.....	17
Q.	Storm Water – Reopener Provision.....	17

I. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

A. Definitions.

1. The "30-day and monthly average" is the arithmetic average of all samples collected during a consecutive 30-day period or calendar month whichever is applicable. The calendar month shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms.
2. The "7-day and weekly average" is the arithmetic average of all samples collected during a consecutive 7-day period or calendar week whichever is applicable. The 7-day and weekly averages are applicable only to those effluent characteristics for which there are 7-day average effluent limitations. The calendar week, beginning on Sunday and ending on Saturday, shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms. Weekly averages shall be calculated for all calendar weeks with Saturdays in the month. If a calendar week overlaps two months (i.e., the Sunday is in one month and the Saturday in the following month), the weekly average calculated for that calendar week shall be included in the data for the month that contains the Saturday.
3. "Daily Maximum" ("Daily Max.") is the maximum value allowable in any single sample or instantaneous measurement.
4. A "grab" sample, for monitoring requirements, is defined as a single "dip and take" sample collected at a representative point in the discharge stream.
5. An "instantaneous" measurement, for monitoring requirements, is defined as a single reading, observation, or measurement.
6. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
7. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.
8. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
9. "Director" means Director of the Utah Division of Water Quality.
10. "EPA" means the United States Environmental Protection Agency.
11. "Irrigation season" is defined as the months of April through September.

12. "Non-irrigation season" is defined as the months of October through March.
13. "Act" means the "*Utah Water Quality Act*".
14. "CWA" means *The Federal Water Pollution Control Act*, as amended, by *The Clean Water Act of 1987*.
15. "Point Source" means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharges. This term does not include return flows from irrigated agriculture or agriculture storm water runoff.
16. "Method detection level" (MDL) is the minimum concentration of an analyte (substance) that can be measured and reported with a 99 percent confidence that the analyte concentration is greater than zero as determined by the procedure set forth in appendix B of 40 CFR part 136.
17. "Minimum Level" (ML) is the concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. The M L is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method-specified sample weights, volumes and processing steps have been followed.
18. "Quantification level" is a measurement of the concentration of a contaminant obtained by using a specified laboratory procedure calibrated at a specified concentration above the method detection level. It is considered the lowest concentration at which a particular contaminant can be quantitatively measured using a specified laboratory procedure for monitoring of the contaminant.

B. Description of Discharge Point.

The authorization to discharge provided under this permit is limited to those outfalls specifically designated below as discharge locations. Discharges at any location not authorized under a UPDES permit are in violation of the *Act* and may be subject to penalties under the *Act*. Knowingly discharging from an unauthorized location or failing to report an unauthorized discharge may be subject to criminal penalties as provided under the *Act*.

<u>Outfall Number</u>	<u>Location of Discharge Point</u>
001	The discharge pipe from the third retention pond prior to mixture with any receiving water at latitude N 40.366969° and longitude -109.414831°.
002	Discharge leaving the east side of the third retention pond located at latitude N 40.367113° and longitude -109.414844°.

C. Narrative Standard.

It shall be unlawful, and a violation of this permit, for the permittee to discharge or place any waste or other substance in such a way as will be or may become offensive such as unnatural deposits, floating debris, oil, scum or other nuisances such as color, odor or taste, or cause conditions which produce undesirable aquatic life or which produce objectionable tastes in edible aquatic organisms; or result in concentrations or combinations of substances which produce undesirable physiological responses in desirable resident fish, or other desirable aquatic life, or undesirable human health effects, as determined by bioassay or other tests performed in accordance with standard procedures.

D. Specific Limitations and Self-Monitoring Requirements.

1. Effluent Limitations

Effective immediately and lasting the duration of this permit, the permittee is authorized to discharge from Outfalls 001 and 002. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristics	Effluent Limitations a/			
	Average 30-Day	Average 7-Day	Daily Minimum	Daily Maximum
Total Flow, MGD b/	1.5	NA	NA	Report
Total Suspended Solids, mg/L	25	35	NA	NA
BOD5, mg/L	25	35	NA	NA
Total Dissolved Solids, mg/L	NA	NA	NA	1400/1200c/
Oil & Grease, mg/L	NA	NA	NA	10
pH, Standard Units	NA	NA	6.5	9.0
Undiss. H ₂ S mg/L	NA	NA	NA	0.002 c/

NA = not applicable

MGD = million gallons per day

mg/L = milligrams per liter

a/ See Part I.A for definition of terms.

b/ Flow measurements of effluent volume shall be made in such a manner that the permittee can affirmatively demonstrate that representative values are being obtained.

c/ Compliance with final TDS and the undissociated hydrogen sulfide effluent limits will be held in abeyance until the end of the thirty month implementation period of an approved compliance plan for both parameters*. At the conclusion of the thirty month implementation period, undissociated hydrogen sulfide shall be limited to 0.002 mg/L and TDS shall be limited to 1200 mg/L. Until the conclusion of the thirty month implementation period the limit for TDS will be 1400 mg/L. There shall be no limit for undissociated hydrogen sulfide until the conclusion of the thirty month implementation period.

There shall be no discharge of sanitary wastes.

*The permittee will be given thirty months after approval of a treatment plan to develop and implement a process to remove enough sulfides to impact growth of the white bacteria, to meet the future undissociated hydrogen sulfide limit and a TDS limit of 1200 mg/L. Within one hundred twenty (120) days after permit issuance the permittee is required to submit to the Director, for approval, a detailed approvable plan to comply with the narrative standard, and the future hydrogen sulfide and final TDS limitations. An approvable plan will need to contain current industrial standards for construction, like utilization of closed tankage, in order to minimize nuisance hydrogen sulfide odors with a plan that has a reasonable chance for approval. Close coordination with the Director will be required to develop a plan that is feasible. The approved plan shall contain an implementation schedule that shall provide for final implementation within thirty (30) months after approval. If implementation does not occur as per the approved plan, the permittee will be considered as non-compliant with its UPDES permit.

Self-Monitoring and Reporting Requirements			
Parameter	Frequency	Sample Type	Units
Total Flow	Continuous	Instantaneous	MGD
BOD ₅	Monthly	Grab	mg/L
Total Suspended Solids	Monthly	Grab	mg/L
Total Dissolved Solids	Monthly	Grab	mg/L
Oil & Grease	Monthly	Grab	mg/L
pH	Monthly	Grab	SU
Undiss. H ₂ S	Monthly	Grab	mg/L
Chronic WET	Semi -annually	Grab	Pass/Fail

2. Outfalls

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: at the Outfall pipe 001 of the final treatment cell prior to mixing with any receiving water, and at the discharge pipe of Outfall 002 prior to mixing with any receiving water, in the months that this Outfall is discharging.

3. Undissociated Hydrogen Sulfide Analysis Study

The EPA approved undissociated hydrogen sulfide analysis methods have minimum quantification levels (ML) that may exceed the effluent limit for undissociated hydrogen sulfide included in this permit. As a result, the permittee has 30 months after the approval of a treatment plan to demonstrate to the Director's satisfaction that ML for the approved analytical methods below the effluent limit is unachievable. At which time, the permit will be reopened, modified to include the new acceptable ML, and will include provisions that allow for the measured values below the ML but in excess of the effluent limit to be considered in compliance with the permit. The modified permit will be re-public noticed at that time following all appropriate administrative procedures.

4. Whole Effluent Testing - Chronic Toxicity

Starting on the effective date of this permit, the permittee shall semi-annually conduct chronic short-term toxicity tests on grab samples of the final effluent. The sample shall be collected at Outfalls 001 and 002, once during the irrigation season and once during the non-irrigation season. Samples shall only be taken if there is a discharge from an Outfall during that respective season.

The monitoring frequency shall be semi-annually. If chronic toxicity is detected, the test shall be repeated in less than four weeks from the date the initial sample was taken. The need for any additional samples, and/or a Toxicity Reduction Evaluation (TRE) (*see Part I.D.4.a.*) shall be determined by the Director. If the second test shows no chronic toxicity, routine monitoring shall be resumed.

The chronic toxicity tests shall be conducted in general accordance with the procedures set out in the latest revision of *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms, Fourth Edition, October 2002, EPA-821-R-02-013* as per 40 CFR 136.3(a) TABLE IA-LIST OF APPROVED BIOLOGICAL METHODS. Tests will be conducted using both Ceriodaphnia dubia and Pimephales promelas (fathead minnow) species. A CO₂ atmosphere may be used (in conjunction with an unmodified test) in order to account for pH drift.

During the non-irrigation season chronic toxicity occurs at Outfalls 001 and 002 when the IC₂₅ is less than or equal to an effluent concentration of 14.8%. During the irrigation season chronic toxicity occurs at Outfalls 001 and 002 when the IC₂₅ is less than or equal to an effluent concentration of 43.6%. If any of the acceptable control performance criteria are not met, the test shall be considered invalid.

Semi-annual test results shall be reported along with the Discharge Monitoring Report (DMR) submitted for the month in which the WET was completed. All test results shall be reported along with the DMR submitted for that reporting period. The format for the report shall be consistent with the latest revision of *Region VIII* and shall include all the physical testing as specified.

If the results for a minimum of ten consecutive tests indicate no chronic toxicity, the permittee may request a reduction in testing frequency and/or reduction to one species. The Director may approve, partially approve, or deny the request based on results and other available information. If approval is given, the modification will take place without a public notice.

The current Utah whole effluent toxicity (WET) policy is in the process of being updated and revised to assure its consistency with the Environmental Protection Agency's national and regional WET policy. When said revised WET policy has been finalized and officially adopted, this permit will be reopened and modified to incorporate satisfactory follow-up chronic toxicity language (chronic pattern of toxicity, PTI and/or TIE/TRE, etc.) without a public notice, as warranted and appropriate.

- a. *Toxicity Reduction Evaluation (TRE)*. If toxicity is detected during the life of this permit and it is determined by the Director that a TRE is necessary, the permittee

shall be so notified and shall initiate a TRE immediately thereafter. The purpose of the TRE will be to establish the cause of toxicity, locate the source(s) of the toxicity, and control or provide treatment for the toxicity.

A TRE may include but is not limited to one, all, or a combination of the following:

- (1) Phase I – Toxicity Characterization
- (2) Phase II – Toxicity Identification Procedures
- (3) Phase III – Toxicity Control Procedures
- (4) Any other appropriate procedures for toxicity source elimination and control.

If the TRE establishes that the toxicity cannot be immediately eliminated, the permittee shall submit a proposed compliance plan to the Director. The plan shall include the proposed approach to control toxicity and a proposed compliance schedule for achieving control. If the approach and schedule are acceptable to the Director, this permit may be reopened and modified.

If the TRE shows that the toxicity is caused by a toxicant(s) that may be controlled with specific numerical limitations, the permittee may:

- (a) Submit an alternative control program for compliance with the numerical requirements.
- (b) If necessary, provide a modified biomonitoring protocol, which compensates for the pollutant(s) being controlled numerically.

If acceptable to the Director, this permit may be reopened and modified to incorporate any additional numerical limitations, a modified compliance schedule if judged necessary by the Director, and/or a modified biomonitoring protocol.

Failure to conduct an adequate TRE, or failure to submit a plan or program as described above, or the submittal of a plan or program judged inadequate by the Director, shall be considered a violation of this permit.

II. MONITORING, RECORDING AND REPORTING REQUIREMENTS

A. Representative Sampling.

Samples taken in compliance with the monitoring requirements established under *Part I* shall be collected from the effluent stream prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge. Sludge samples shall be collected at a location representative of the quality of sludge immediately prior to the use-disposal practice.

B. Monitoring Procedures.

Monitoring must be conducted according to test procedures approved under *Utah Administrative Code ("UAC") R317-2-10*, unless other test procedures have been specified in this permit.

C. Penalties for Tampering.

The *Act* provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

D. Reporting of Monitoring Results.

Monitoring results obtained during the previous month shall be summarized for each month and reported on a Discharge Monitoring Report Form (EPA No. 3320-1), post-marked no later than the 28th day of the month following the completed reporting period. If no discharge occurs during the reporting period, "no discharge" shall be reported. Legible copies of these, and all other reports required herein, shall be signed and certified in accordance with the requirements of *Signatory Requirements (see Part IV.G)*, and submitted through netDMR or to the Director, Division of Water Quality at the following addresses:

Original to: Department of Environmental Quality
Division of Water Quality
195 North 1950 West
PO Box 144870
Salt Lake City, Utah 84114-4870

E. Compliance Schedules.

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any Compliance Schedule of this permit shall be submitted no later than 14 days following each schedule date.

F. Additional Monitoring by the Permittee.

If the permittee monitors any parameter more frequently than required by this permit, using test procedures approved under *UAC R317-2-10* or as otherwise specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. Such increased frequency shall also be indicated. Only those parameters required by the permit need to be reported.

G. Records Contents.

Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements:

2. The individual(s) who performed the sampling or measurements;
3. The date(s) and time(s) analyses were performed;
4. The individual(s) who performed the analyses;
5. The analytical techniques or methods used; and,
6. The results of such analyses.

H. Retention of Records.

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time. A copy of this UPDES permit must be maintained on site during the duration of activity at the permitted location.

I. Twenty-four Hour Notice of Noncompliance Reporting.

1. The permittee shall (orally) report any noncompliance which may seriously endanger health or environment as soon as possible, but no later than twenty-four (24) hours from the time the permittee first became aware of circumstances. The report shall be made to the Division of Water Quality, (801) 536-4300, or 24 hour answering service (801) 536-4123.
2. The following occurrences of noncompliance shall be reported by telephone (801) 536-4123 as soon as possible but no later than 24 hours from the time the permittee becomes aware of the circumstances:
 - a. Any noncompliance which may endanger health or the environment;
 - b. Any unanticipated bypass which exceeds any effluent limitation in the permit (See *Part III.G, Bypass of Treatment Facilities.*);
 - c. Any upset which exceeds any effluent limitation in the permit (See *Part III.H, Upset Conditions.*); or,
 - d. Violation of a maximum daily discharge limitation for any of the pollutants listed in the permit.
3. A written submission shall also be provided within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:
 - a. A description of the noncompliance and its cause;
 - b. The period of noncompliance, including exact dates and times;
 - c. The estimated time noncompliance is expected to continue if it has not been corrected; and,
 - d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

- e. Steps taken, if any, to mitigate the adverse impacts on the environment and human health during the noncompliance period.
 4. The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the Division of Water Quality, (801) 538-6146.
 5. Reports shall be submitted to the addresses in *Part II.D, Reporting of Monitoring Results*.
- J. Other Noncompliance Reporting.
Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for *Part II.D* are submitted. The reports shall contain the information listed in *Part II.I.3*.
- K. Inspection and Entry.
The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:
1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the permit;
 2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
 3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and,
 4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the *Act*, any substances or parameters at any location.

III. COMPLIANCE RESPONSIBILITIES

A. Duty to Comply.

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

B. Penalties for Violations of Permit Conditions.

The Act provides that any person who violates a permit condition implementing provisions of the Act is subject to a civil penalty not to exceed \$10,000 per day of such violation. Any person who willfully or negligently violates permit conditions of the Act is subject to a fine not exceeding \$25,000 per day of violation; Any person convicted under *UCA 19-5-115(2)* a second time shall be punished by a fine not exceeding \$50,000 per day. Except as provided at *Part III.G, Bypass of Treatment Facilities* and *Part III.H, Upset Conditions*, nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

C. Need to Halt or Reduce Activity not a Defense.

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to Mitigate.

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. Proper Operation and Maintenance.

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

F. Removed Substances.

Collected screening, grit, solids, sludges, or other pollutants removed in the course of treatment shall be buried or disposed of in such a manner so as to prevent any pollutant from entering any waters of the state or creating a health hazard. Sludge/digester supernatant and filter backwash shall not directly enter either the final effluent or waters of the state by any other direct route.

G. Bypass of Treatment Facilities.

1. Bypass Not Exceeding Limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to 2. and 3. of this section.

2. Prohibition of Bypass.

- a. Bypass is prohibited, and the Director may taken enforcement action against a permittee for bypass, unless:
 - (1) Bypass was unavoidable to prevent loss of human life, personal injury, or severe property damage;
 - (2) There were no feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance, and
 - (3) The permittee submitted notices as required under section G.3.
- b. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed in sections G.2a. (1), (2) and (3).

3. Notice.

- a. Anticipated bypass. Except as provided above in section G.2. and below in section G. 3.b, if the permittee knows in advance of the need for a bypass, it shall submit prior notice, at least ninety days before the date of bypass. The prior notice shall include the following unless otherwise waived by the Director:
 - (1) Evaluation of alternative to bypass, including cost-benefit analysis containing an assessment of anticipated resource damages;
 - (2) A specific bypass plan describing the work to be performed including scheduled dates and times. The permittee must notify the Director in advance of any changes to the bypass schedule;
 - (3) Description of specific measures to be taken to minimize environmental and public health impacts;
 - (4) A notification plan sufficient to alert all downstream users, the public and others reasonably expected to be impacted by the bypass;
 - (5) A water quality assessment plan to include sufficient monitoring of the receiving water before, during and following the bypass to enable evaluation of public health risks and environmental impacts; and
 - (6) Any additional information requested by the Director.
- b. Emergency Bypass. Where ninety days advance notice is not possible, the permittee must notify the Director, and the Director of the Department of Natural Resources, as soon as it becomes aware of the need to bypass and provide to the Director the information in section G.3.a.(1) through (6i) to the extent practicable.

- c. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass to the Director as required under Part II.I., Twenty Four Hour Reporting. The permittee shall also immediately notify the Director of the Department of Natural Resources, the public and downstream users and shall implement measures to minimize impacts to public health and environment to the extent practicable.

H. Upset Conditions.

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with technology based permit effluent limitations if the requirements of paragraph 2. of this section are met. Director's administrative determination regarding a claim of upset cannot be judiciously challenged by the permittee until such time as an action is initiated for noncompliance.
2. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
 - a. An upset occurred and that the permittee can identify the cause(s) of the upset;
 - b. The permitted facility was at the time being properly operated;
 - c. The permittee submitted notice of the upset as required under Part II.I., Twenty-four Hour Notice of Noncompliance Reporting; and,
 - d. The permittee complied with any remedial measures required under Part III.D, Duty to Mitigate.
3. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

I. Toxic Pollutants.

The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of *The Water Quality Act of 1987* for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

J. Changes in Discharge of Toxic Substances.

Notification shall be provided to the Director as soon as the permittee knows of, or has reason to believe:

1. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":
 - a. One hundred micrograms per liter (100 ug/L);
 - b. Two hundred micrograms per liter (200 ug/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/L) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;

- c. Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with *UAC R317-8-3.4(7)* or (10); or,
 - d. The level established by the Director in accordance with *UAC R317-8-4.2(6)*.
- 2. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":
 - a. Five hundred micrograms per liter (500 ug/L);
 - b. One milligram per liter (1 mg/L) for antimony;
 - c. Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with *UAC R317-8-3.4(9)*; or,
 - d. The level established by the Director in accordance with *UAC R317-8-4.2(6)*.

K. Industrial Pretreatment.

Any wastewaters discharged to the sanitary sewer, either as a direct discharge or as a hauled waste, are subject to Federal, State and local pretreatment regulations. Pursuant to Section 307 of *The Water Quality Act of 1987*, the permittee shall comply with all applicable federal General Pretreatment Regulations promulgated at *40 CFR 403*, the State Pretreatment Requirements at *UAC R317-8-8*, and any specific local discharge limitations developed by the Publicly Owned Treatment Works (POTW) accepting the wastewaters.

In addition, in accordance with *40 CFR 403.12(p)(1)*, the permittee must notify the POTW, the EPA Regional Waste Management Director, and the State hazardous waste authorities, in writing, if they discharge any substance into a POTW which if otherwise disposed of would be considered a hazardous waste under *40 CFR 261*. This notification must include the name of the hazardous waste, the EPA hazardous waste number, and the type of discharge (continuous or batch).

IV. GENERAL REQUIREMENTS

A. Planned Changes.

The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when the alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are not subject to effluent limitations in the permit. In addition, if there are any planned substantial changes to the permittee's existing sludge facilities or their manner of operation or to current sludge management practices of storage and disposal, the permittee shall give notice to the Director of any planned changes at least 30 days prior to their implementation.

B. Anticipated Noncompliance.

The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

C. Permit Actions.

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

D. Duty to Reapply.

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee shall apply for and obtain a new permit. The application shall be submitted at least 180 days before the expiration date of this permit.

E. Duty to Provide Information.

The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

F. Other Information.

When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Director, it shall promptly submit such facts or information.

G. Signatory Requirements.

All applications, reports or information submitted to the Director shall be signed and certified.

1. All permit applications shall be signed by either a principal executive officer or ranking elected official
2. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 - a. The authorization is made in writing by a person described above and submitted to the Director, and,

- b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)
3. Changes to authorization. If an authorization under paragraph IV.G.2 is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph IV.G.2 must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.
4. Certification. Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

H. Penalties for Falsification of Reports.

The *Act* provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than \$10,000.00 per violation, or by imprisonment for not more than six months per violation, or by both.

I. Availability of Reports.

Except for data determined to be confidential under *UAC R317-8-3.2*, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the office of Director. As required by the *Act*, permit applications, permits and effluent data shall not be considered confidential

J. Oil and Hazardous Substance Liability.

Nothing in this permit shall be construed to preclude the permittee of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under the *Act*.

K. Property Rights.

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

L. Severability.

The provisions of this permit are severable, and if any provisions of this permit, or the application of any provision of this permit to any circumstance, are held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

M. Transfers.

This permit may be automatically transferred to a new permittee if:

1. The current permittee notifies the Director at least 20 days in advance of the proposed transfer date;
2. The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them; and,
3. The Director does not notify the existing permittee and the proposed new permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 2 above.

N. State Laws.

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by *UCA 19-5-117*.

O. Water Quality-Reopener Provision.

This permit may be reopened and modified (following proper administrative procedures) to include the appropriate effluent limitations and compliance schedule, if necessary, if one or more of the following events occurs:

1. Water Quality Standards for the receiving water(s) to which the permittee discharges are modified in such a manner as to require different effluent limits than contained in this permit.
2. A final wasteload allocation is developed and approved by the State and/or EPA for incorporation in this permit.
3. A revision to the current Water Quality Management Plan is approved and adopted which calls for different effluent limitations than contained in this permit.

P. Toxicity Limitation - Reopener Provision.

This permit may be reopened and modified (following proper administrative procedures) to include, whole effluent toxicity (WET) limitations, a compliance date, a compliance schedule, a change in the whole effluent toxicity (biomonitoring) protocol, additional or modified numerical limitations, or any other conditions related to the control of toxicants if one or more of the following events occur;

1. Toxicity is detected, as per *Part I.D.4* of this permit, during the duration of this permit.
2. The TRE results indicate that the toxicant(s) represent pollutant(s) that may be controlled with specific numerical limits, and the Director agrees that numerical controls are the most appropriate course of action.
3. Following the implementation of numerical control(s) of toxicant(s), the Director agrees that a modified biomonitoring protocol is necessary to compensate for those toxicants that are controlled numerically.
4. The TRE reveals other unique conditions or characteristics, which in the opinion of the permit issuing authority justify the incorporation of unanticipated special conditions in the permit.

Q. Storm Water – Reopener Provision.

This permit may be reopened and modified (following proper administrative procedures) as per UAC R317.8, to include, any applicable storm water provisions and requirements, a storm water pollution prevention plan, a compliance schedule, a compliance date, monitoring and/or reporting requirements, or any other conditions related to the control of storm water discharges to “waters-of-State”.

United States
Environmental Protection
Agency

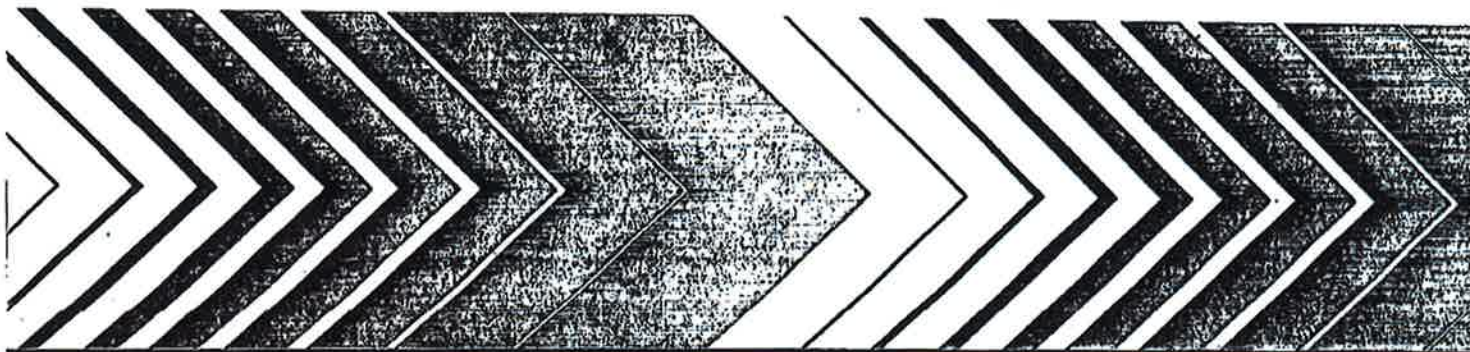
Office of
Research and Development
Washington, DC 20460

EPA/600/4-79/020
March 1983



Methods for Chemical Analysis of Water and Wastes

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SULFIDE

Method 376.2 (Colorimetric, Methylene Blue)

STORET NO. Total 00745

Dissolved 00746

1. Scope and Application

- 1.1 This method is applicable to the measurement of total and dissolved sulfides in drinking, surface and saline waters, domestic and industrial wastes.
- 1.2 Acid insoluble sulfides are not measured by this method. Copper sulfide is the only common sulfide in this class.
- 1.3 The method is suitable for the measurement of sulfide in concentrations up to 20 mg/l.

2. Summary of Method

- 2.1 Sulfide reacts with dimethyl-p-phenylenediamine (p-aminodimethyl aniline) in the presence of ferric chloride to produce methylene blue, a dye which is measured at a wavelength maximum of 625 nm.

3. Comments

- 3.1 Samples must be taken with a minimum of aeration. Sulfide may be volatilized by aeration and any oxygen inadvertently added to the sample may convert the sulfide to an unmeasurable form. Dissolved oxygen should not be present in any water used to dilute standards.
- 3.2 The analysis must be started immediately.
- 3.3 Color and turbidity may interfere with observations of color or with photometric readings.

4. Apparatus

- 4.1 Matched test tubes, approximately 125 mm long and 15 mm O.D.
- 4.2 Droppers, delivering 20 drops/ml. To obtain uniform drops, hold dropper in vertical position and allow drops to form slowly.
- 4.3 Photometer, use either 4.3.1 or 4.3.2.
 - 4.3.1 Spectrophotometer, for use at 625 nm with cells of 1 cm and 10 cm light path.
 - 4.3.2 Filter photometer, with filter providing transmittance near 625 nm.

5. Reagents

- 5.1 Amino-sulfuric acid stock solution: Dissolve 27 g N,N-dimethyl-p-phenylenediamine oxalate (p-aminodimethylaniline) in a cold mixture of 50 ml conc. H_2SO_4 and 20 ml distilled water in a 100 ml volumetric flask. Cool and dilute to the mark. If dark discard and purchase fresh reagent. Store in dark glass bottle.
- 5.2 Amino-sulfuric acid reagent: Dissolve 25 ml amino-sulfuric acid stock solution (5.1) with 975 ml of 1 + 1 H_2SO_4 (5.4). Store in a dark glass bottle. This solution should be clear.
- 5.3 Ferric chloride solution: Dissolve 100 g $FeCl_3 \cdot 6H_2O$ in 40 ml distilled water.

Approved for NPDES

Issued 1978

- 5.4 Sulfuric acid solution, H_2SO_4 , 1 + 1
- 5.5 Diammonium hydrogen phosphate solution: Dissolve 400 g $(\text{NH}_4)_2\text{HPO}_4$ in 800 ml distilled water.
- 5.6 Methylene blue solution I: Dissolve 1.0 g of methylene blue in distilled water in a 1 liter volumetric flask and dilute to the mark. Use U.S.P. grade or one certified by the Biological Stain Commission. The dye content reported on the label should be 84% or more. Standardize (5.8) against sulfide solutions of known strength and adjust concentration so that 0.05 ml (1 drop) equals 1.0 mg/1 sulfide.
- 5.7 Methylene blue solution II: Dilute 10.00 ml of adjusted methylene blue solution I (5.6) to 100 ml with distilled water in a volumetric flask.
- 5.8 Standardization of methylene blue I solution:
 - 5.8.1 Place several grams of clean, washed crystals of sodium sulfide $\text{Na}_2\text{S} \cdot 9\text{H}_2\text{O}$ in a small beaker.
 - 5.8.2 Add somewhat less than enough water to cover the crystals.
 - 5.8.3 Stir occasionally for a few minutes. Pour the solution into another vessel. This reacts slowly with oxygen but the change is insignificant over a few hours. Make the solution daily.
 - 5.8.4 To 1 liter of distilled water add 1 drop of solution and mix.
 - 5.8.5 Immediately determine the sulfide concentration by the methylene blue procedure (6) and by the titrimetric iodide procedure (Method 376.1, this manual).
 - 5.8.6 Repeat using more than one drop of sulfide solution or less water until at least five tests have been made in the range of 1 to 8 mg/1 sulfide.
 - 5.8.7 Calculate the average percent error of the methylene blue procedure (6) as compared to the titrimetric iodide procedure (Method 376.1).
 - 5.8.8 Adjust by dilution or by adding more dye to methylene blue solution I (5.6).
6. Procedure
 - 6.1 Color development
 - 6.1.1 Transfer 7.5 ml of sample to each of two matched test tubes using a special wide tipped pipet or filling to a mark on the test tubes.
 - 6.1.2 To tube A add 0.5 ml amine-sulfuric acid reagent (5.2) and 0.15 ml (3 drops) FeCl_3 solution (5.3).
 - 6.1.3 Mix immediately by inverting the tube only once.
 - 6.1.4 To tube B add 0.5 ml 1 + 1 H_2SO_4 (5.4) and 0.15 ml (3 drops) FeCl_3 solution (5.3) and mix.
 - 6.1.5 Color will develop in tube A in the presence of sulfide. Color development is usually complete in about 1 minute, but a longer time is often required for the fading of the initial pink color.
 - 6.1.6 Wait 3 to 5 minutes.
 - 6.1.7 Add 1.6 ml $(\text{NH}_4)_2\text{HPO}_4$ solution (5.5) to each tube.
 - 6.1.8 Wait 3 to 5 minutes and make color comparisons. If zinc acetate was used wait at least 10 minutes before making comparison.

6.2 Color comparison

6.2.1 Visual

- 6.2.1.1 Add methylene blue solution I (5.6) and/or II (5.7) (depending on sulfide concentration and accuracy desired) dropwise to tube B (6.1.4) until the color matches that developed in the first tube.
- 6.2.1.2 If the concentration exceeds 20 mg/l, repeat 6.2.1.1 using a portion of the sample diluted to one tenth.

6.2.2 Photometric

- 6.2.2.1 Use a 1 cm cell for 0.1 to 2.0 mg/l. Use a 10 cm cell for up to 20 mg/l.
- 6.2.2.2 Zero instrument with portion of sample from tube B (6.1.4).
- 6.2.2.3 Prepare calibration curve from data obtained in methylene blue standardization (5.8), plotting concentration obtained from titrimetric iodide procedure (Method 376.1) versus absorbance. A straight line relationship can be assumed from 0 to 1.0 mg/l.
- 6.2.2.4 Read the sulfide concentration from the calibration curve.

7. Calculations

- 7.1 Visual comparison: With methylene blue solution I (5.6), adjusted so that 0.05 ml (1 drop) = 1.0 mg/l sulfide and a 7.5 ml sample

$$\text{mg/l sulfide} = \text{number drops methylene blue solution I (5.6)} + 0.1 \times [\text{number of drops methylene blue solution II (5.7)}]$$

- 7.2 Photometric: see 6.2.2.4

8. Precision and Accuracy:

- 8.1 The precision has not been determined. The accuracy is about $\pm 10\%$.

Bibliography

1. Standard Methods for the Examination of Water and Wastewater, 14th edition, p. 503, Method 428C (1975).

SULFIDE (4500-S²⁻)/Calculation of Un-ionized Hydrogen Sulfide

insert the electrodes. Record potential when the rate of change is less than 0.3 mV/min. Read sulfide concentration from the calibration curve. Alternatively, for potentials in the linear range, calculate the sulfide concentration from:

$$S_{Tot} = 10^{\frac{E-b}{m}}$$

where:

E = electrode potential and

b and m are the intercept and slope of the calibration curve.

For a meter that can be calibrated directly in concentration, follow the manufacturer's directions.

d. Sulfide determination by comparison with calibration curve, with ZnS precipitation: Place filter with ZnS precipitate in a 150-mL beaker containing a stir bar. Wash sample bottle with 50 mL AAR and 20 mL DRW and pour the washings into the beaker. Stir to dissolve precipitate. Remove filter with forceps while rinsing it into the beaker with a minimum amount of DRW. Quantitatively transfer to a 100-mL volumetric flask and dilute to mark with DRW. Pour into the electrochemical cell and place the electrodes in the solution. Measure potential as in ¶ c above. Calculate sulfide concentration (¶ c above).

e. Sulfide determination by standard addition with or without ZnS precipitation: Measure the Ag/S-ISE electrode potential as in ¶ c or d above. Add sulfide stock solution and measure potential again. Calculate sulfide concentration as follows:

$$C_o = \frac{fC_s}{(1+f)10^{\frac{E_s-E_o}{m}} - 1}$$

where:

C_o and C_s = sulfide concentrations in sample and known addition,
 E_o and E_s = potentials measured for sample and known addition,

m = slope of calibration curve (approximately 28 mV/log S²⁻, and

f = ratio of known-addition volume to sample volume.

f. Sulfide determination by titration: Use the same procedure as for standardizing the sulfide stock solution (4500-S²⁻.G.3c). The minimum sulfide concentration for determination by titration is 0.3 mg/L (10⁻⁵M).

5. Precision

For sulfide determination by comparison with the calibration curve, the relative standard deviation varies with the sulfide concentration. RSD values of 23% for 0.0091 mg/L and 5% for 0.182 mg/L have been reported.² (0.0091 µg/L was below the range for which the potential varied linearly with the logarithm of the sulfide concentration, i.e., the Nernstian range.) For sulfide determination by standard addition, the precision is greatest if the amount of sulfide added is as large as possible while staying within the linear range.³

6. References

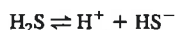
1. GRAN, G. 1952. Determination of the equivalence point in potentiometric titrations. Part II. *Analyst* 77:661.
2. BAUMANN, E. 1974. Determination of parts per billion sulfide in water with the sulfide-selective electrode. *Anal. Chem.* 46:1345.
3. RATZLAFF, K.L. 1979. Optimizing precision in standard addition measurement. *Anal. Chem.* 51:232.

7. Bibliography

- ORION RESEARCH, INC. 1980. Instruction Manual for Silver-Sulfide Electrode.
- VIVIT, D.V., J.W. BALL & E.A. JENNE. 1984. Specific-ion electrode determinations of sulfide preconcentrated from San Francisco Bay waters. *Environ. Geol. Water Sci.* 6:79.

4500-S²⁻ H. Calculation of Un-ionized Hydrogen Sulfide

Hydrogen sulfide (H₂S) and bisulfide ion (HS⁻), which together constitute dissolved sulfide, are in equilibrium with hydrogen ions:



The fraction of sulfide present as un-ionized H₂S can be estimated with an error of less than 40% from Figure 4500-S²⁻.3. If more accuracy is needed, use the methods given below. For both fresh water and seawater, it is convenient to define "conditional" dissociation constants, which are valid for the temperature and ionic strength of the water of interest. In the following mass-action equation for fresh water, K'_{FW} is a mixed equilibrium constant that relates the hydrogen ion activity (calculated from the pH) and the concentrations of H₂S and HS⁻:

$$K'_{FW} = \frac{[\text{H}^+][\text{HS}^-]}{[\text{H}_2\text{S}]}$$

The square brackets indicate concentrations and the braces indicate activity. The value of pK'_{FW} for H₂S is approximately 7.0 ± 0.3 for the ionic strengths and temperatures likely to be encountered in water-quality monitoring. For seawater, it is convenient to use a stoichiometric equilibrium constant (K'_{SW}), which relates the concentrations of H⁺, HS⁻, and H₂S:

$$K'_{SW} = \frac{[\text{H}^+][\text{HS}^-]}{[\text{H}_2\text{S}]}$$

The mass-action equations can be rearranged to give:

SULFIDE (4500-S²⁻)/Calculation of Un-ionized Hydrogen Sulfide

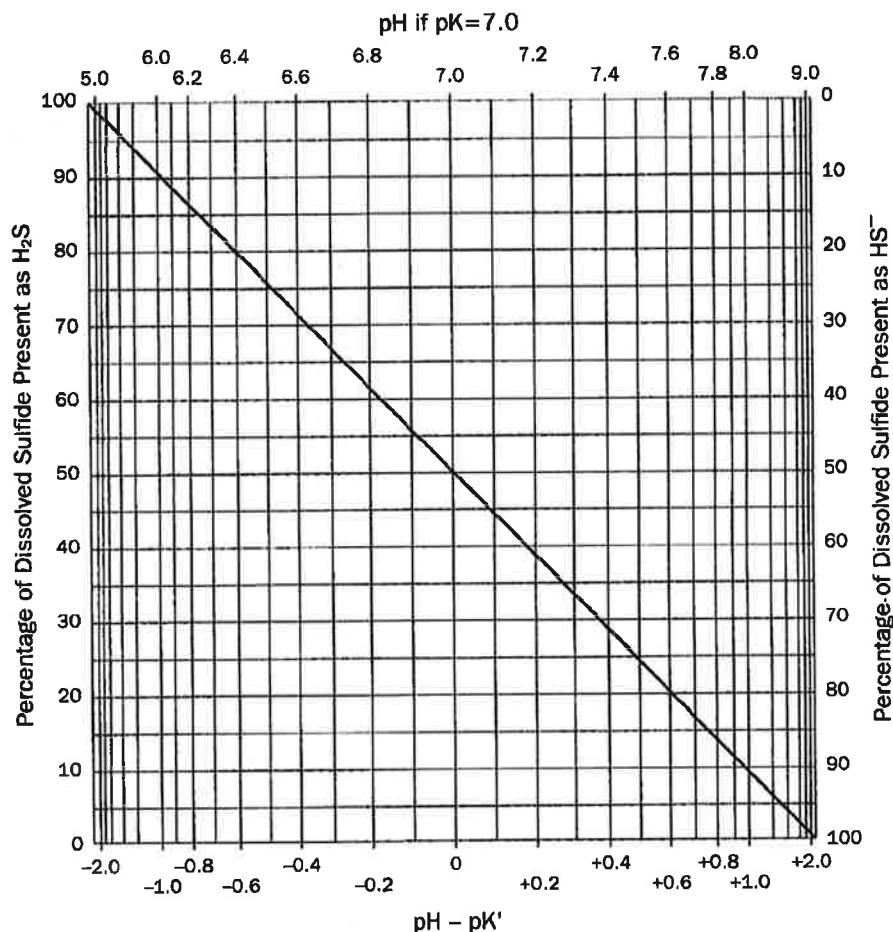


Figure 4500-S²⁻:3. Proportion of H₂S and HS⁻ in dissolved sulfide.

$$pH - pK' = \log \frac{[HS^-]}{[H_2S]}$$

In this equation, pK' can be either pK'_{FW} or pK'_{SW} . The fraction of un-ionized H₂S can either be read from Figure 4500-S²⁻:3 or calculated with the following equation:

$$\alpha_{H_2S} = \frac{[H_2S]}{S_T} = \frac{1}{10^{pH - pK'} + 1}$$

where:

S_T = total dissolved sulfide concentration.

1. Calculation for Fresh Water ($I \leq 0.01M$)

Calculate ionic strength I as in Table 2330:I. Read value of pK'_{FW} from Table 4500-S²⁻:II.

Sample calculation: Total sulfide concentration, 1.5 mg S²⁻/L; pH, 6.87; temperature, 10°C; ionic strength, 0.04. From Table 4500-S²⁻:II, $pK'_{FW} = 7.11$.

$$pH - pK'_{FW} = -0.24$$

$$10^{pH - pK'_{FW}} = 10^{-0.24} = 0.575$$

$$\alpha_{H_2S} = \frac{1}{1 + 0.575} = 0.63$$

$$0.63 \times 1.5 = 0.95$$

The concentration of un-ionized H₂S is 0.95 mg S²⁻/L.

2. Calculation for Seawater, Estuarine Water, and Brackish Water

This procedure is the same as that for fresh water. A potential source of error is the determination of the hydrogen ion concen-

SULFIDE (4500-S²⁻)/Calculation of Un-ionized Hydrogen Sulfide

TABLE 4500-S²⁻:II. CONDITIONAL FIRST DISSOCIATION CONSTANT OF HYDROGEN SULFIDE, FRESH WATER*

Temperature °C	pK'_{FW} at Given Ionic Strength						
	0.00 mol/L	0.005 mol/L	0.01 mol/L	0.02 mol/L	0.03 mol/L	0.05 mol/L	0.10 mol/L
0	7.36	7.33	7.32	7.30	7.29	7.27	7.24
5	7.28	7.25	7.23	7.22	7.21	7.19	7.16
10	7.20	7.16	7.15	7.13	7.12	7.10	7.07
15	7.12	7.09	7.08	7.06	7.05	7.03	7.00
20	7.05	7.02	7.00	6.99	6.97	6.96	6.92
25	6.98	6.95	6.94	6.92	6.91	6.89	6.86
30	6.92	6.89	6.87	6.86	6.84	6.83	6.79

* Values calculated according to Millero¹.

TABLE 4500-S²⁻:III. CONDITIONAL FIRST DISSOCIATION CONSTANT OF HYDROGEN SULFIDE, SEAWATER*

Temperature °C	pK'_{SW} at Given Salinity						
	5‰	10‰	15‰	20‰	25‰	30‰	35‰
0	7.17	7.12	7.09	7.07	7.06	7.06	7.06
5	7.08	7.02	6.99	6.97	6.96	6.96	6.96
10	6.99	6.93	6.90	6.88	6.87	6.86	6.86
15	6.91	6.85	6.82	6.80	6.78	6.78	6.77
20	6.83	6.77	6.74	6.72	6.70	6.69	6.69
25	6.76	6.70	6.66	6.64	6.63	6.62	6.61
30	6.70	6.63	6.60	6.57	6.56	6.55	6.54

* Values calculated according to Millero¹.

tration. If the pH electrode is calibrated using NIST buffers as in Section 4500-H⁺, then a correction factor² must be determined. Add acid (HNO₃, HCl, or HClO₄, not H₂SO₄) to artificial seawater diluted to the salinity of interest and at the temperature of interest to give an acid concentration of 0.001N. (Prepare artificial seawater as in Table 8010:III, substituting NaCl for Na₂SO₄ on an equimolar basis and omitting NaF, SrCl₂ · 6H₂O, H₃BO₃, KBr, Na₂SiO₃ · 9H₂O, Na₄EDTA, and NaHCO₃.) Measure the pH. The difference between the negative logarithm of the known acid concentration and the measured pH is the correction factor. For example, if the acid concentration is 0.001N and the measured pH is 3.15, the correction factor is 0.15. Subtract 0.15 from measured pH values to get p[°]H, the negative logarithm of the hydrogen ion concentration. (The pH in fresh water corresponds to the negative logarithm of the hydrogen ion activity.) Alternatively, calibrate the pH electrode with Tris* buffer in artificial seawater diluted to the salinity of interest and at the temperature of interest.³ Read pK'_{SW} from Table 4500-S²⁻:III. Calculate the fraction of un-ionized H₂S as for fresh water.

Sample calculation: Total sulfide concentration, 1.5 mg S²⁻/L; temperature 10°C; pH, 7.15; salinity 25‰. From Table 4500-S²⁻: III, pK'_{SW} = 6.87.

$$pH - pK'_{SW} = 0.28$$

$$10^{pH - pK'_{SW}} = 10^{0.28} = 1.91$$

* Trishydroxymethylaminomethane.

$$\alpha_{H_2S} = \frac{1}{1 + 1.91} = 0.34$$

$$0.34 \times 1.5 = 0.51$$

The concentration of un-ionized H₂S is 0.51 mg S²⁻/L.

3. References

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**FACT SHEET STATEMENT OF BASIS
GOLDEN STATE OPERATING - ASHLEY VALLEY UNIT
NORTH PRODUCTION FACILITY
UPDES PERMIT NO. UT0000035
MINOR INDUSTRIAL RENEWAL PERMIT**

FACILITY CONTACT: Ellis Peterson, Senior Engineer
Summit Operating, LLC for Golden State Operating-Ashley Valley
10447 South Jordan Gateway
South Jordan, Utah 84095
(801) 657-5708

DESCRIPTION OF FACILITY:

Golden State Operating (GSO) is the current permit owner of the Ashley Valley Unit North Production Facility located in Uintah County near Jensen, Utah. Golden State Operating became the permit owner effective December 1, 2014. GSO is located in California and has contracted with Summit Operating, LLC to act as a contract pumper and agent. Historically, water produced in association with oil production in the area flowed through three facilities which were permitted to discharge water. The facility known as CIMA (UT0021768) was terminated on January 28, 2013 at the request of its permit owner. A second facility known as "USA Pan American Facility" (UT0000124) was not renewed at the request of its permit owner because the facility was no longer discharging and is not expected to resume discharging. The Ashley Valley Unit North Production Facility (UT0000035) continues to discharge water produced in association with oil production in the area. The Ashley Valley Unit North Production Facility (AVU) has a Standard Industrial Classification (SIC) Code 1311 for *crude petroleum and natural gas extraction*. Under normal operations the facility continuously discharges effluent, which consists of groundwater produced in association with oil from nearby oil wells. The produced water is separated from the oil by both mechanical and gravity means in treatment vessels along with three retention ponds in series. The final effluent discharges from a culvert leaving the third retention pond, and flows through an unnamed ditch approximately $\frac{1}{4}$ of a mile to a private retention pond before continuing down an unnamed ditch approximately another $\frac{1}{2}$ mile where it flows through a diversion structure, ultimately mixes with other waters and flows into the Union Irrigation Canal and Ashley Creek. During irrigation season most of the water is diverted into the Union Irrigation Canal with a small amount being diverted to Ashley Creek. During the non-irrigation season, most, if not all the water, is diverted to Ashley Creek.

A compliance evaluation inspection was completed at the AVU on May 8, 2013, and a report was sent to the previous permit owner on July 26, 2013. The results of this inspection indicated a violation of the narrative standard, Part I.C of UPDES permit UT0000035. It appears that as a result of effluent flowing in the unnamed ditch for many years, a white mat of vegetative growth is present in areas along the unnamed ditch leading to Union Canal. It is probable that the white mat is composed of a naturally occurring sulfide consuming bacteria which, after oxidizing the

sulfide to sulfur, incorporates the sulfur into its cell structure and appears white in color. The previous permit owner was given 90 days to develop a plan to significantly reduce or eliminate the growth of the white organisms. On October 2, 2013 a plan was proposed for control of the white biomass through use of an algacide/bactericide called Earth Tec, which contains 20% copper pentahydrate. On November 19, 2013 the Division of Water Quality (DWQ) denied the use of copper pentahydrate due to the existence of water quality standards for copper, and the potential violation of those standards in Ashley Creek with the use of this pesticide. Because of the complexity of the matter, DWQ scheduled a meeting on March 5, 2014 with the previous permit owner and, as a result of that meeting; the following conditions are reflected in this permit:

1. A second discharge point will be added for the treatment system known as Outfall 002. This second discharge point may be used for irrigation, at the discretion of GSO. If a discharge occurs from Outfall 002, it must be sampled at the same frequency and for the same parameters as for Outfall 001.
2. A compliance schedule will be included in the renewal of this permit to allow GSO to develop and implement an approvable compliance plan to meet new effluent limits for TDS, undissociated hydrogen sulfide and for conformance with the narrative standard. All other permit limits shall be in effect at permit issuance.

DESCRIPTION OF DISCHARGES:

Discharge Monitoring Reports (DMR) are presently being submitted on a monthly basis by GSO and will continue to be so until the renewal permit is issued. GSO also monitors undissociated hydrogen sulfide on a monthly basis. The method and calculations for determining undissociated hydrogen sulfide will be included as an addendum to the permit. A summary of three years of data is attached to this Fact Sheet Statement of Basis (FSSOB) as Addendum I.

<u>Outfall</u>	<u>Description of Discharge Point</u>
001	18" culvert leaving the southeast side of the third retention pond located at latitude N 40.366969° and longitude -109.414831°.
002	Discharge leaving the northeast side of the third retention pond located at latitude N 40.367133° and longitude -109.414844°.

RECEIVING WATERS AND STREAM CLASSIFICATION

The discharge flows through an unnamed ditch and pond approximately ¾ to 1 mile with no mixing until it enters the Union Irrigation Canal, where it mixes with water diverted from Ashley Creek and subsequently used for nearby agricultural practices. During high runoff events and non-irrigation months, it is probable that most of the discharge would flow through the irrigation structure in Union Canal into Ashley Creek which is tributary to the Green River. The receiving waters are designated as follows:

Unnamed discharge ditch – 2B, 3E and 4

Union Irrigation Canal – 2B, 3E and 4

Ashley Creek – 2B, 3B and 4

Green River - 1C, 2A, 3B and 4

Class 1C -protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.

Class 2A -protected for frequent primary contact recreation where there is a high likelihood of ingesting of water or a high degree of bodily contact with the water. Examples include, but are not limited to swimming, rafting, kayaking, diving, and water skiing.

Class 2B -protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.

Class 3B -protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain.

Class 4 -protected for agricultural uses including irrigation of crops and stock watering.

Class 3E -Severely habitat limited waters. Narrative standards will be applied to protect these waters for aquatic wildlife.

SUBSTANTIVE PERMIT CHANGES

Several changes are being incorporated into the renewal permit. Discharge monitoring reports shall be submitted monthly rather than quarterly. Monitoring and effluent limits for undissociated hydrogen sulfide, and monitoring for chronic whole effluent toxicity (WET) have been added. WET testing will occur on a semi-annual basis. In the area where the unnamed ditch containing discharge from Outfall 001 enters Ashley Creek, Ashley Creek has been designated as non-attainment for TDS and included on the 303(d) list. Because Ashley Creek has been included on the 303(d) list a thirty month compliance schedule is included in the renewal permit, at the end of which the TDS limit may be lowered to 1,200 mg/L. At the end of the thirty month compliance schedule a new undissociated hydrogen sulfide limit of 0.002 mg/l will also come into effect. The undissociated hydrogen sulfide limit is intended to help in meeting the narrative standard and in addressing nuisance odors from the facility. The permit will require submission of an approvable compliance plan within 120 days of permit issuance to achieve the future limits and move towards compliance with the narrative standard. This plan must be approved by the Director. If implementation of the compliance plan does not occur as

approved by the Director, GSO will be considered as non-compliant with its UPDES permit. All other permit limitations and requirements remain unchanged.

BASIS FOR EFFLUENT LIMITATIONS

In accordance with regulations promulgated in *40 Code of Federal Regulations (CFR) Part 122.44* and in *UAC R317-8-4.2*, effluent limitations are derived from technology-based effluent limitations guidelines, Utah Secondary Treatment Standards (*UAC R317-1-3.2*) or Utah Water Quality Standards (*UAC R317-2*). A waste load analysis for irrigation and non-irrigation seasons was completed and is included in Addendum II of this FSSOB. In cases where multiple limits have been developed, those that are more stringent apply. In some cases multiple limits (categorical limits and water quality standards) could be used. In cases where no limits are applicable, Best Professional Judgment (BPJ) may be used. "Best Professional Judgment" refers to a discretionary, best professional decision made by the permit writer based upon precedent, prevailing regulatory standards or other relevant information.

As previously stated, the produced water discharged from the Ashley Valley facility has been utilized for nearby agricultural practices for more than fifty years and no ill-effects to crops, livestock, or wildlife have been reported by downstream users. Based upon this information, the applicable technology based standards for oil and gas extraction are found in *40 CFR 435, Subpart E-Agriculture and Wildlife Water Use Subcategory (Subpart E)*. Subpart E includes an effluent limitation of 35 mg/L for oil & grease. This oil & grease concentration limit has not been utilized previously; instead the more stringent effluent limitation of 10 mg/L has been used.

The 10 mg/L requirement is based on the permitting authority's best professional judgment (BPJ) and EPA's Anti-Backsliding Policy, which is consistent with many other discharge permits in Utah.

The biochemical oxygen demand (BOD₅), pH, and total suspended solids (TSS) limits are based on current Utah Secondary Treatment Standards, *Utah Administrative Code (UAC) R317-1-3.2*. The effluent flow limitation is the same as in the previous permit, 1.5 million gallons per day (MGD).

The undissociated hydrogen sulfide limit is taken from the water quality standards R317-2-14, Table 2.14.2. It is anticipated that the undissociated hydrogen sulfide limit will help to reduce the narrative standard violation existing in the unnamed ditch; however it is unknown how much a 0.002 mg/l limit for undissociated hydrogen sulfide will reduce or inhibit the growth of Beggiatoa and/or Thiothrix along the unnamed ditch. However, at the end of the thirty month compliance schedule, an undissociated hydrogen sulfide limit of 0.002 mg/l will come into effect.

The TDS concentration limit for the renewal permit is based on the fact that Ashley Creek is listed on Utah's 303(d) list as impaired for TDS in that stretch where GSO's discharge enters Ashley Creek. The listing occurred in 2010. As a result, there is no assimilative capacity for TDS, and the effluent must meet the water quality standard of 1200 mg/L. This facility cannot

achieve a 1200 mg/L daily maximum limit for TDS without the addition of treatment systems. This type of treatment system will take some time to design and construct, so the requirement for compliance with the 1200 mg/L TDS standard will be held in abeyance until the compliance plan is adopted, approved and implemented. Within one hundred twenty (120) days of permit issuance GSO will be required to submit to the Director for approval a detailed plan to comply with the 1200 mg/L TDS daily maximum limit. GSO will be given a thirty month time period to implement the approved compliance plan. Until implementation of the compliance plan for TDS, an interim limit of 1400 mg/L will be in effect. This limit was proposed by GSO as a number that could be met.

The table below is a replica of what will be incorporated in the permit and the permittee is expected to be able to comply with the limitations presented below.

Effluent Characteristics	Effluent Limitations a/			
	Average 30-Day	Average 7-Day	Daily Minimum	Daily Maximum
Total Flow, MGD b/	1.5	NA	NA	Report
Total Suspended Solids, mg/L	25	35	NA	NA
BOD5, mg/L	25	35	NA	NA
Total Dissolved Solids, mg/L	NA	NA	NA	1400/1200 c/
Oil & Grease, mg/L	NA	NA	NA	10
pH, Standard Units	NA	NA	6.5	9.0
Undiss. H ₂ S mg/L	NA	NA	NA	0.002 c/

NA = not applicable mg/L = milligrams per liter MGD = million gallons per day

- a/ See Part I.A for definition of terms.
- b/ Flow measurements of effluent volume shall be made in such a manner that the permittee can affirmatively demonstrate that representative values are being obtained.
- c/ Compliance with final TDS and the undissociated hydrogen sulfide effluent limits will be held in abeyance until the end of the thirty month implementation period of an approved compliance plan for both parameters*. At the conclusion of the thirty month implementation period, undissociated hydrogen sulfide shall be limited to 0.002 mg/L and TDS shall be limited to 1200 mg/L. Until the conclusion of the thirty month implementation period the limit for TDS will be 1400 mg/L. There shall be no limit for undissociated hydrogen sulfide until the conclusion of the thirty month implementation period.

*The permittee will be given thirty months after approval of a treatment plan to develop and implement a process to remove enough sulfides to impact growth of the white bacteria, to meet the future undissociated hydrogen sulfide limit and a TDS limit of 1200 mg/L. Within one hundred twenty (120) days after permit issuance the permittee is required to submit to the Director, for approval, a detailed approvable plan to comply with the narrative standard, and the future hydrogen sulfide and final TDS limitations. An approvable plan will need to contain current industrial standards for construction, like utilization of closed tankage, in order to

minimize nuisance hydrogen sulfide odors with a plan that has a reasonable chance for approval. Close coordination with the Director will be required to develop a plan that is feasible. The approved plan shall contain an implementation schedule that shall provide for final implementation within thirty (30) months after approval. If implementation does not occur as per the approved plan, the permittee will be considered as non-compliant with its UPDES permit.

Discharges from GSO may eventually reach the Colorado River, which place it under the guidance of the Colorado River Basin Salinity Control Forum (CRBSCF) for total dissolved solids (TDS) mass loading limitations, which is authorized in *UAC R317-2-4* to further control salinity in the Utah portion of the Colorado River Basin. On February 28, 1977 the CRBSCF produced the "*Policy For Implementation of Colorado River Salinity Standards Through the NPDES Permit Program*" (Policy), with the most current subsequent triennial revision dated October 2011, which states that if a no-salt (i.e., no-TDS) discharge cannot be achieved, then the facility is limited to discharging one-ton per day of TDS unless a demonstration is made that it is not economically feasible and/or practicable to do so. GSO's TDS discharge exceeds the one ton per day loading limitation guideline as set by the CRBSCF; therefore a cost analysis of alternative plans was prepared in response to the 1977 Policy and was completed in 1987. The analysis indicated that a zero discharge (no-salt) or one-ton per day discharge of TDS is not economically feasible or practical considering the low production yields of the extraction system. As the State permitting authority for the CRBSCF Policy, Utah Division of Water Quality staff concurs that the exemption to the Policy is still applicable since production trends have been decreasing over time.

There shall be no discharge of sanitary wastes.

SELF-MONITORING AND REPORTING REQUIREMENTS

The following effluent self-monitoring and reporting requirements are based on BPJ. Reports shall be made on Discharge Monitoring Report (DMR) forms, or on NET DMR, and are due 28 days after the end of each month.

Self-Monitoring and Reporting Requirements			
Parameter	Frequency	Sample Type	Units
Total Flow	Continuous	Instantaneous	MGD
BOD ₅	Monthly	Grab	mg/L
Total Suspended Solids	Monthly	Grab	mg/L
Oil & Grease	Monthly	Grab	mg/L
pH	Monthly	Grab	SU
Total Dissolved Solids	Monthly	Grab	mg/L
Undissoc. H ₂ S	Monthly	Grab	mg/L
Chronic WET	Semi-annually	Grab	Pass/Fail

UNDISSOCIATED HYDROGEN SULFIDE ANALYSIS STUDY

The EPA approved undissociated hydrogen sulfide analysis methods have minimum quantification levels (ML) that may exceed the effluent limit for undissociated hydrogen sulfide included in this permit. As a result, the permittee has 30 months after the approval of a treatment plan to demonstrate to the Director's satisfaction that ML for the approved analytical methods below the effluent limit is unachievable. At which time, the permit will be reopened, modified to include the new acceptable ML, and will include provisions that allow for the measured values below the ML but in excess of the effluent limit to be considered in compliance with the permit. The modified permit will be re-public noticed at that time following all appropriate administrative procedures.

WASTE LOAD ANALYSIS AND ANTIDegradation REVIEW

During this UPDES renewal permit development, WLAs for non-irrigation and irrigation seasons were completed. The WLAs are appended in Appendix II. An ADR Level I review was performed and concluded that an ADR Level II review was not required. The WLAs indicate that the effluent limitations should be sufficiently protective of water quality, in order to meet State water quality standards in the receiving waters.

STORM WATER REQUIREMENTS

According to Utah Administrative Code (UAC) R317-8-3.9 this facility will not be required to maintain coverage under the UPDES multi-sector general permit for discharges associated with industrial activity, permit number UTR000000, sector I (Oil and Gas Extraction, SIC Major Group 13), because storm water will not come in contact with or be contaminated by any overburden, raw material, intermediate product, finished product, by product, or waste product located at the site of the operation.

PRETREATMENT REQUIREMENTS

This facility does not discharge process wastewater to a sanitary sewer system. Any process wastewater that the facility may discharge to the sanitary sewer, either as a direct discharge or as a hauled waste, is subject to federal, state, and local pretreatment regulations. Pursuant to section 307 of the Clean Water Act, the permittee shall comply with all applicable federal general pretreatment regulations promulgated, found in 40 CFR 403, the state's pretreatment requirements found in UAC R317-8-8, and any specific local discharge limitations developed by the Publicly Owned Treatment Works (POTW) accepting the waste.

BIOMONITORING REQUIREMENTS

As part of a nationwide effort to control toxic discharges, biomonitoring requirements are being included in permits for facilities where effluent toxicity is an existing or potential concern. In Utah, this is done in accordance with the *State of Utah Permitting and Enforcement Guidance Document for Whole Effluent Toxicity Control (Biomonitoring (2/1991))*. Authority to require

effluent biomonitoring is provided in *UAC R317-8, Utah Pollutant Discharge Elimination System* and *UAC R317-2, Water Quality Standards*.

Acute WET testing was completed at this facility from 2004 to 2009. During that time period there were no acute toxicity failures. As a result it was eliminated from the permit for the last five year cycle. Based on this information there appears to be no reasonable potential for acute toxicity. However since no testing for chronic toxicity has previously been required, inclusion of chronic WET testing is appropriate. Grab sampling will be required because of concerns for the presence of volatile and semi-volatile organic compounds. Chronic WET testing can be substituted for the testing of a number of organic compounds. WET testing can determine that even if no particular organic compound exceeds its water quality standard, that the combination of otherwise innocuous organic compounds is not exhibiting a synergistic or additive toxic effect. Monitoring will be semi-annually during irrigation and non-irrigation season in order to see if there is any effect of temperature on chronic toxicity.

The renewal permit will contain a toxicity limitation re-opener provision that allows for modification of the permit at any time in the future should testing indicate the presence of toxicity in the discharge.

PERMIT DURATION

It is recommended that this permit be effective for aduration of five (5) years.

Drafted by
Mike Herkimer, Environmental Scientist
Utah Division of Water Quality
Drafted on October 6, 2014

ADDENDUM TO FACT SHEET STATEMENT OF BASIS

Addendum I: DMR data

Addendum II: Wasteload allocation for irrigation and non-irrigation seasons.

This permit and associated material was public noticed in the Vernal Express from March 10, 2015 to April 9, 2015. Several comments were received by email and responded to by email. No substantive comments were made, however there were some minor modifications made to the permit to clarify minimum quantification levels for undissociated hydrogen sulfide. In response to the commenters it was noted that each had a right to appeal this decision to the Director of the Utah Division of Water Quality, the procedures can be found under UCA 19-5-112(2)(a)

WASTELOAD ANALYSIS [WLA]
Addendum: Statement of Basis
SUMMARY

Wasteload Applicable for Irrigation Season (April-September)

Discharging Facility: Western Energy Operating

UPDES No: UT-0021768

Current Flow: 1.50 MGD Design Flow

Design Flow 1.50 MGD

Receiving Water: Union Canal => Ashley Creek

Stream Classification: 2B, 3B, 4

Stream Flows [cfs]: 3.00 Irrigation 20th Percentile

Stream TDS Values: 1477.0 Irrigation Average

Effluent Limits:

Flow, MGD: 1.50 MGD Design Flow

BOD, mg/l: 25.0 Irrigation 5.0 Indicator

Dissolved Oxygen, mg/l: 4.0 Irrigation 5.5 30 Day Average

TNH₃, Chronic, mg/l: 5.7 Irrigation Varies Function of pH and Temperature

TDS, mg/l: 1200.0 Irrigation 1200.0

WQ Standard:

Modeling Parameters:

Acute River Width: 50.0%

Chronic River Width: 100.0%

Level 1 Antidegradation Level Completed: Level II Review not required.

Date: 7/24/2014

Permit Writer:

WLA by:

WQM Sec. Approval:

TMDL Sec. Approval:

FILE COPY

Utah Division of Water Quality
Salt Lake City, Utah

WASTELOAD ANALYSIS [WLA]
Addendum: Statement of Basis

24-Jul-14
4:00 PM

Facilities: Western Energy Operating
Discharging to: Union Canal => Ashley Creek

UPDES No: UT-0021768

I. Introduction

Wasteload analyses are performed to determine point source effluent limitations necessary to maintain designated beneficial uses by evaluating projected effects of discharge concentrations on in-stream water quality. The wasteload analysis also takes into account downstream designated uses [R317-2-8, UAC]. Projected concentrations are compared to numeric water quality standards to determine acceptability. The anti-degradation policy and procedures are also considered. The primary in-stream parameters of concern may include metals (as a function of hardness), total dissolved solids (TDS), total residual chlorine (TRC), un-ionized ammonia (as a function of pH and temperature, measured and evaluated in terms of total ammonia), and dissolved oxygen.

Mathematical water quality modeling is employed to determine stream quality response to point source discharges. Models aid in the effort of anticipating stream quality at future effluent flows at critical environmental conditions (e.g., low stream flow, high temperature, high pH, etc).

The numeric criteria in this wasteload analysis may always be modified by narrative criteria and other conditions determined by staff of the Division of Water Quality.

II. Receiving Water and Stream Classification

Union Canal => Ashley Creek:
Antidegradation Review:

2B, 3B, 4
Level I review completed. Level II review not required.

III. Numeric Stream Standards for Protection of Aquatic Wildlife

Total Ammonia (TNH3)	Varies as a function of Temperature and pH Rebound. See Water Quality Standards
Chronic Total Residual Chlorine (TRC)	0.011 mg/l (4 Day Average) 0.019 mg/l (1 Hour Average)
Chronic Dissolved Oxygen (DO)	5.50 mg/l (30 Day Average) 4.00 mg/l (7Day Average) 3.00 mg/l (1 Day Average)
Maximum Total Dissolved Solids	1200.0 mg/l

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Salt Lake City, Utah**

Acute and Chronic Heavy Metals (Dissolved)

Parameter	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard		
	Concentration	Load*	Concentration		Load*
Aluminum	87.00 ug/l**	1.090 lbs/day	750.00	ug/l	9.399 lbs/day
Arsenic	190.00 ug/l	2.381 lbs/day	340.00	ug/l	4.261 lbs/day
Cadmium	0.87 ug/l	0.011 lbs/day	10.54	ug/l	0.132 lbs/day
Chromium III	312.24 ug/l	3.913 lbs/day	6532.76	ug/l	81.867 lbs/day
Chromium VI	11.00 ug/l	0.138 lbs/day	16.00	ug/l	0.201 lbs/day
Copper	35.74 ug/l	0.448 lbs/day	61.56	ug/l	0.771 lbs/day
Iron			1000.00	ug/l	12.532 lbs/day
Lead	23.53 ug/l	0.295 lbs/day	603.87	ug/l	7.568 lbs/day
Mercury	0.0120 ug/l	0.000 lbs/day	2.40	ug/l	0.030 lbs/day
Nickel	197.19 ug/l	2.471 lbs/day	1773.60	ug/l	22.226 lbs/day
Selenium	4.60 ug/l	0.058 lbs/day	20.00	ug/l	0.251 lbs/day
Silver	N/A ug/l	N/A lbs/day	56.51	ug/l	0.708 lbs/day
Zinc	453.86 ug/l	5.688 lbs/day	453.86	ug/l	5.688 lbs/day

* Allowed below discharge

**Chronic Aluminum standard applies only to waters with a pH < 7.0 and a Hardness < 50 mg/l as CaCO₃

Metals Standards Based upon a Hardness of 481.56 mg/l as CaCO₃

Organics [Pesticides]

Parameter	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard		
	Concentration	Load*	Concentration		Load*
Aldrin			1.500	ug/l	0.019 lbs/day
Chlordane	0.004 ug/l	0.123 lbs/day	1.200	ug/l	0.015 lbs/day
DDT, DDE	0.001 ug/l	0.029 lbs/day	0.550	ug/l	0.007 lbs/day
Dieldrin	0.002 ug/l	0.054 lbs/day	1.250	ug/l	0.016 lbs/day
Endosulfan	0.056 ug/l	1.606 lbs/day	0.110	ug/l	0.001 lbs/day
Endrin	0.002 ug/l	0.066 lbs/day	0.090	ug/l	0.001 lbs/day
Guthion			0.010	ug/l	0.000 lbs/day
Heptachlor	0.004 ug/l	0.109 lbs/day	0.260	ug/l	0.003 lbs/day
Lindane	0.080 ug/l	2.294 lbs/day	1.000	ug/l	0.013 lbs/day
Methoxychlor			0.030	ug/l	0.000 lbs/day
Mirex			0.010	ug/l	0.000 lbs/day
Parathion			0.040	ug/l	0.001 lbs/day
PCB's	0.014 ug/l	0.401 lbs/day	2.000	ug/l	0.025 lbs/day
Pentachlorophenol	13.00 ug/l	372.807 lbs/day	20.000	ug/l	0.251 lbs/day
Toxephene	0.0002 ug/l	0.006 lbs/day	0.7300	ug/l	0.009 lbs/day

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Salt Lake City, Utah**

IV. Numeric Stream Standards for Protection of Agriculture

4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
	Concentration	Concentration	Load*
Arsenic		100.0 ug/l	lbs/day
Boron		750.0 ug/l	lbs/day
Cadmium		10.0 ug/l	0.06 lbs/day
Chromium		100.0 ug/l	lbs/day
Copper		200.0 ug/l	lbs/day
Lead		100.0 ug/l	lbs/day
Selenium		50.0 ug/l	lbs/day
TDS, Summer		1200.0 mg/l	7.52 tons/day

V. Numeric Stream Standards for Protection of Human Health (Class 1C Waters)

4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
Metals	Concentration	Concentration	Load*
Arsenic		ug/l	lbs/day
Barium		ug/l	lbs/day
Cadmium		ug/l	lbs/day
Chromium		ug/l	lbs/day
Lead		ug/l	lbs/day
Mercury		ug/l	lbs/day
Selenium		ug/l	lbs/day
Silver		ug/l	lbs/day
Fluoride (3)		ug/l	lbs/day
to		ug/l	lbs/day
Nitrates as N		ug/l	lbs/day
Chlorophenoxy Herbicides			
2,4-D		ug/l	lbs/day
2,4,5-TP		ug/l	lbs/day
Endrin		ug/l	lbs/day
ocyclohexane (Lindane)		ug/l	lbs/day
Methoxychlor		ug/l	lbs/day
Toxaphene		ug/l	lbs/day

VI. Numeric Stream Standards the Protection of Human Health from Water & Fish Consumption [Toxics]

Maximum Conc., ug/l - Acute Standards			
Class 1C		Class 3A, 3B	
Toxic Organics	[2 Liters/Day for 70 Kg Person over 70 Yr.]	[6.5 g for 70 Kg Person over 70 Yr.]	
Acenaphthene	ug/l lbs/day	2700.0 ug/l	77.43 lbs/day
Acrolein	ug/l lbs/day	780.0 ug/l	22.37 lbs/day
Acrylonitrile	ug/l lbs/day	0.7 ug/l	0.02 lbs/day
Benzene	ug/l lbs/day	71.0 ug/l	2.04 lbs/day
Benzidine	ug/l lbs/day	0.0 ug/l	0.00 lbs/day
Carbon tetrachloride	ug/l lbs/day	4.4 ug/l	0.13 lbs/day
Chlorobenzene	ug/l lbs/day	21000.0 ug/l	602.23 lbs/day
1,2,4-Trichlorobenzene			
Hexachlorobenzene	ug/l lbs/day	0.0 ug/l	0.00 lbs/day
1,2-Dichloroethane	ug/l lbs/day	99.0 ug/l	2.84 lbs/day

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Salt Lake City, Utah**

1,1,1-Trichloroethane				
Hexachloroethane	ug/l	lbs/day	8.9 ug/l	0.26 lbs/day
1,1-Dichloroethane				
1,1,2-Trichloroethane	ug/l	lbs/day	42.0 ug/l	1.20 lbs/day
1,1,2,2-Tetrachloroethane	ug/l	lbs/day	11.0 ug/l	0.32 lbs/day
Chloroethane			0.0 ug/l	0.00 lbs/day
Bis(2-chloroethyl) ether	ug/l	lbs/day	1.4 ug/l	0.04 lbs/day
2-Chloroethyl vinyl ether	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
2-Chloronaphthalene	ug/l	lbs/day	4300.0 ug/l	123.31 lbs/day
2,4,6-Trichlorophenol	ug/l	lbs/day	6.5 ug/l	0.19 lbs/day
p-Chloro-m-cresol			0.0 ug/l	0.00 lbs/day
Chloroform (HM)	ug/l	lbs/day	470.0 ug/l	13.48 lbs/day
2-Chlorophenol	ug/l	lbs/day	400.0 ug/l	11.47 lbs/day
1,2-Dichlorobenzene	ug/l	lbs/day	17000.0 ug/l	487.52 lbs/day
1,3-Dichlorobenzene	ug/l	lbs/day	2600.0 ug/l	74.56 lbs/day
1,4-Dichlorobenzene	ug/l	lbs/day	2600.0 ug/l	74.56 lbs/day
3,3'-Dichlorobenzidine	ug/l	lbs/day	0.1 ug/l	0.00 lbs/day
1,1-Dichloroethylene	ug/l	lbs/day	3.2 ug/l	0.09 lbs/day
1,2-trans-Dichloroethylene	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
2,4-Dichlorophenol	ug/l	lbs/day	790.0 ug/l	22.66 lbs/day
1,2-Dichloropropane	ug/l	lbs/day	39.0 ug/l	1.12 lbs/day
1,3-Dichloropropylene	ug/l	lbs/day	1700.0 ug/l	48.75 lbs/day
2,4-Dimethylphenol	ug/l	lbs/day	2300.0 ug/l	65.96 lbs/day
2,4-Dinitrotoluene	ug/l	lbs/day	9.1 ug/l	0.26 lbs/day
2,6-Dinitrotoluene	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
1,2-Diphenylhydrazine	ug/l	lbs/day	0.5 ug/l	0.02 lbs/day
Ethylbenzene	ug/l	lbs/day	29000.0 ug/l	831.65 lbs/day
Fluoranthene	ug/l	lbs/day	370.0 ug/l	10.61 lbs/day
4-Chlorophenyl phenyl ether				
4-Bromophenyl phenyl ether				
Bis(2-chloroisopropyl) ether	ug/l	lbs/day	170000.0 ug/l	4875.17 lbs/day
Bis(2-chloroethoxy) methane	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Methylene chloride (HM)	ug/l	lbs/day	1600.0 ug/l	45.88 lbs/day
Methyl chloride (HM)	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Methyl bromide (HM)	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Bromoform (HM)	ug/l	lbs/day	360.0 ug/l	10.32 lbs/day
Dichlorobromomethane	ug/l	lbs/day	22.0 ug/l	0.63 lbs/day
Chlorodibromomethane	ug/l	lbs/day	34.0 ug/l	0.98 lbs/day
Hexachlorobutadiene(c)	ug/l	lbs/day	50.0 ug/l	1.43 lbs/day
Hexachlorocyclopentadiene	ug/l	lbs/day	17000.0 ug/l	487.52 lbs/day
Isophorone	ug/l	lbs/day	600.0 ug/l	17.21 lbs/day
Naphthalene				
Nitrobenzene	ug/l	lbs/day	1900.0 ug/l	54.49 lbs/day
2-Nitrophenol	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
4-Nitrophenol	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
2,4-Dinitrophenol	ug/l	lbs/day	14000.0 ug/l	401.48 lbs/day
4,6-Dinitro-o-cresol	ug/l	lbs/day	765.0 ug/l	21.94 lbs/day
N-Nitrosodimethylamine	ug/l	lbs/day	8.1 ug/l	0.23 lbs/day
N-Nitrosodiphenylamine	ug/l	lbs/day	16.0 ug/l	0.46 lbs/day
N-Nitrosodi-n-propylamine	ug/l	lbs/day	1.4 ug/l	0.04 lbs/day
Pentachlorophenol	ug/l	lbs/day	8.2 ug/l	0.24 lbs/day

**Utah Division of Water Quality
Salt Lake City, Utah**

Phenol	ug/l	lbs/day	4.6E+06 ug/l	1.32E+05 lbs/day
Bis(2-ethylhexyl)phthala	ug/l	lbs/day	5.9 ug/l	0.17 lbs/day
Butyl benzyl phthalate	ug/l	lbs/day	5200.0 ug/l	149.12 lbs/day
Di-n-butyl phthalate	ug/l	lbs/day	12000.0 ug/l	344.13 lbs/day
Di-n-octyl phthlate				
Diethyl phthalate	ug/l	lbs/day	120000.0 ug/l	3441.30 lbs/day
Dimethyl phthlate	ug/l	lbs/day	2.9E+06 ug/l	8.32E+04 lbs/day
Benzo(a)anthracene (P/	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Benzo(a)pyrene (PAH)	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Benzo(b)fluoranthene (F	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Benzo(k)fluoranthene (F	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Chrysene (PAH)	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Acenaphthylene (PAH)				
Anthracene (PAH)	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Dibenzo(a,h)anthracene	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Indeno(1,2,3-cd)pyrene	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Pyrene (PAH)	ug/l	lbs/day	11000.0 ug/l	315.45 lbs/day
Tetrachloroethylene	ug/l	lbs/day	8.9 ug/l	0.26 lbs/day
Toluene	ug/l	lbs/day	200000 ug/l	5735.50 lbs/day
Trichloroethylene	ug/l	lbs/day	81.0 ug/l	2.32 lbs/day
Vinyl chloride	ug/l	lbs/day	525.0 ug/l	15.06 lbs/day
Pesticides				
Aldrin	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Dieldrin	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Chlordane	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDT	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDE	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDD	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
alpha-Endosulfan	ug/l	lbs/day	2.0 ug/l	0.06 lbs/day
beta-Endosulfan	ug/l	lbs/day	2.0 ug/l	0.06 lbs/day
Endosulfan sulfate	ug/l	lbs/day	2.0 ug/l	0.06 lbs/day
Endrin	ug/l	lbs/day	0.8 ug/l	0.02 lbs/day
Endrin aldehyde	ug/l	lbs/day	0.8 ug/l	0.02 lbs/day
Heptachlor	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Heptachlor epoxide				
PCB's				
PCB 1242 (Arochlor 124	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1254 (Arochlor 124	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1221 (Arochlor 122	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1232 (Arochlor 122	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1248 (Arochlor 124	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1260 (Arochlor 124	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1016 (Arochlor 101	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Pesticide				
Toxaphene	ug/l		0.0 ug/l	0.00 lbs/day
Dioxin				
Dioxin (2,3,7,8-TCDD)	ug/l	lbs/day		

**Utah Division of Water Quality
Salt Lake City, Utah**

Metals

Antimony	ug/l	lbs/day		
Arsenic	ug/l	lbs/day	4300.00 ug/l	123.31 lbs/day
Asbestos	ug/l	lbs/day		
Beryllium				
Cadmium				
Chromium (III)				
Chromium (VI)				
Copper				
Cyanide	ug/l	lbs/day	2.2E+05 ug/l	6309.05 lbs/day
Lead	ug/l	lbs/day		
Mercury			0.15 ug/l	0.00 lbs/day
Nickel			4600.00 ug/l	131.92 lbs/day
Selenium	ug/l	lbs/day		
Silver	ug/l	lbs/day		
Thallium			6.30 ug/l	0.18 lbs/day
Zinc				

There are additional standards that apply to this receiving water, but were not considered in this modeling/waste load allocation analysis.

VII. Mathematical Modeling of Stream Quality

Model configuration was accomplished utilizing standard modeling procedures. Data points were plotted and coefficients adjusted as required to match observed data as closely as possible.

The modeling approach used in this analysis included one or a combination of the following models.

(1) The Utah River Model, Utah Division of Water Quality, 1992. Based upon STREAMDO IV (Region VIII) and Supplemental Ammonia Toxicity Models; EPA Region VIII, Sept. 1990 and QUAL2E (EPA, Athens, GA).

(2) Utah Ammonia/Chlorine Model, Utah Division of Water Quality, 1992.

(3) AMMTOX Model, University of Colorado, Center of Limnology, and EPA Region 8

(4) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al. Harper Collins Publisher, Inc. 1987, pp. 644.

Coefficients used in the model were based, in part, upon the following references:

(1) Rates, Constants, and Kinetics Formulations in Surface Water Quality Modeling. Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Athens Georgia. EPA/600/3-85/040 June 1985.

**Utah Division of Water Quality
Salt Lake City, Utah**

(2) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al.
Harper Collins Publisher, Inc. 1987, pp. 644.

VIII. Modeling Information

The required information for the model may include the following information for both the upstream conditions at low flow and the effluent conditions:

Flow, Q, (cfs or MGD)	D.O. mg/l
Temperature, Deg. C.	Total Residual Chlorine (TRC), mg/l
pH	Total NH3-N, mg/l
BOD5, mg/l	Total Dissolved Solids (TDS), mg/l
Metals, ug/l	Toxic Organics of Concern, ug/l

Other Conditions

In addition to the upstream and effluent conditions, the models require a variety of physical and biological coefficients and other technical information. In the process of actually establishing the permit limits for an effluent, values are used based upon the available data, model calibration, literature values, site visits and best professional judgement.

Model Inputs

The following is upstream and discharge information that was utilized as inputs for the analysis. Dry washes are considered to have an upstream flow equal to the flow of the discharge.

Current Upstream Information

	Stream		pH	T-NH3 mg/l as N	BOD5 mg/l	DO mg/l	TRC mg/l	TDS mg/l
	Flow cfs	Temp. Deg. C						
Summer (Irrig. Season)	3.00	16.9	8.2	0.01	0.05	7.23	0.00	1477.0
Fall	3.00	16.9	8.2	0.01	0.05	---	0.00	1477.0
Winter	3.00	16.9	8.2	0.01	0.05	---	0.00	1477.0
Spring	3.00	16.9	8.2	0.01	0.05	---	0.00	1477.0
Dissolved Metals	Al ug/l	As ug/l	Cd ug/l	CrIII ug/l	CrVI ug/l	Copper ug/l	Fe ug/l	Pb ug/l
All Seasons	1.59*	0.53*	0.053*	0.53*	2.65*	0.53*	0.83*	0.53*
Dissolved Metals	Hg ug/l	Ni ug/l	Se ug/l	Ag ug/l	Zn ug/l	Boron ug/l	* 1/2 MDL	
All Seasons	0.0000	0.53*	1.06*	0.1*	0.053*	10.0		

**Utah Division of Water Quality
Salt Lake City, Utah**

Projected Discharge Information

Season	Flow, MGD	Temp.	TDS mg/l	TDS tons/day
Irrigation	1.50000	19.1	1250.00	7.81718

All model numerical inputs, intermediate calculations, outputs and graphs are available for discussion, inspection and copy at the Division of Water Quality.

IX. Effluent Limitations

Current State water quality standards are required to be met under a variety of conditions including in-stream flows targeted to the 7-day, 10-year low flow (R317-2-9).

Other conditions used in the modeling effort coincide with the environmental conditions expected at low stream flows.

Effluent Limitation for Flow based upon Water Quality Standards

In-stream criteria of downstream segments will be met with an effluent flow maximum value as follows:

Season	Daily Average	
Irrigation	1.500 MGD	2.321 cfs

Flow Requirement or Loading Requirement

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 1.5 MGD. If the discharger is allowed to have a flow greater than 1.5 MGD during 7Q10 conditions, and effluent limit concentrations as indicated, then water quality standards will be violated. In order to prevent this from occurring, the permit writers must include the discharge flow limitation as indicated above; or, include loading effluent limits in the permit.

Effluent Limitation for Whole Effluent Toxicity (WET) based upon WET Policy

Effluent Toxicity will not occur in downstream segments if the values below are met.

WET Requirements	LC50 >	EOP Effluent	[Acute]
	IC25 >	43.6% Effluent	[Chronic]

**Utah Division of Water Quality
Salt Lake City, Utah**

Effluent Limitation for Biological Oxygen Demand (BOD) based upon Water Quality Standards or Regulations

In-stream criteria of downstream segments for Dissolved Oxygen will be met with an effluent BOD limitation as follows:

Season	Concentration	
Irrigation	25.0 mg/l as BOD5	312.7 lbs/day

Effluent Limitation for Dissolved Oxygen (DO) based upon Water Quality Standards

In-stream criteria of downstream segments for Dissolved Oxygen will be met with an effluent D.O. limitation as follows:

Season	Concentration
Irrigation	4.00

Effluent Limitation for Total Ammonia based upon Water Quality Standards

In-stream criteria of downstream segments for Total Ammonia will be met with an effluent limitation (expressed as Total Ammonia as N) as follows:

Season	Concentration	Load
Irrigation 4 Day Avg. - Chronic	5.7 mg/l as N	71.2 lbs/day
1 Hour Avg. - Acute	21.7 mg/l as N	270.9 lbs/day

Acute limit calculated with an Acute Zone of Initial Dilution (ZID) to be equal to 100.%.

**Utah Division of Water Quality
Salt Lake City, Utah**

Effluent Limitation for Total Residual Chlorine based upon Water Quality Standards

In-stream criteria of downstream segments for Total Residual Chlorine will be met with an effluent limitation as follows:

Season	Concentration	Load
Irrigation 4 Day Avg. - Chronic	0.024 mg/l	0.30 lbs/day
1 Hour Avg. - Acute	0.042 mg/l	0.53 lbs/day

Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards

Season	Concentration	Load
Irrigation Maximum, Acute	1200.0 mg/l	7.50 tons/day

Ashley Creek is listed on Utah's 303(d) list as impaired for TDS (2010)
No assimilative capacity exists for this pollutant. Effluent limit equals the standard.

Colorado Salinity Forum Limits Determined by Permitting Section

Effluent Limitations for Hydrogen Sulfide (undissociated) based upon Water Quality Standards

Season	Concentration	Load
Irrigation Maximum, Acute	4.6 mg/l	0.02 tons/day

Effluent Limitations for Total Recoverable Metals based upon Water Quality Standards

In-stream criteria of downstream segments for Dissolved Metals will be met with an effluent limitation as follows (based upon a hardness of 481.56 mg/l):

	4 Day Average Concentration	Load	1 Hour Average Concentration	Load
Aluminum*	N/A	N/A	1,233.3 ug/l	15.5 lbs/day
Arsenic*	434.61 ug/l	3.5 lbs/day	559.3 ug/l	7.0 lbs/day
Cadmium	1.89 ug/l	0.0 lbs/day	17.3 ug/l	0.2 lbs/day
Chromium III	714.89 ug/l	5.8 lbs/day	10,755.1 ug/l	134.8 lbs/day

**Utah Division of Water Quality
Salt Lake City, Utah**

Chromium VI*	20.08 ug/l	0.2 lbs/day	23.8	ug/l	0.3 lbs/day
Copper	80.92 ug/l	0.7 lbs/day	100.8	ug/l	1.3 lbs/day
Iron*	N/A	N/A	1,645.6	ug/l	20.6 lbs/day
Lead	52.93 ug/l	0.4 lbs/day	993.7	ug/l	12.5 lbs/day
Mercury*	0.03 ug/l	0.0 lbs/day	4.0	ug/l	0.0 lbs/day
Nickel	451.09 ug/l	3.6 lbs/day	2,919.6	ug/l	36.6 lbs/day
Selenium*	8.49 ug/l	0.1 lbs/day	31.9	ug/l	0.4 lbs/day
Silver	N/A ug/l	N/A lbs/day	93.0	ug/l	1.2 lbs/day
Zinc	1,040.53 ug/l	8.4 lbs/day	747.2	ug/l	9.4 lbs/day
Cyanide*	11.92 ug/l	0.1 lbs/day	36.2	ug/l	0.5 lbs/day

*Limits for these metals are based on the dissolved standard.

**Effluent Limitations for Heat/Temperature based upon
Water Quality Standards**

Irrigation	21.5 Deg. C.	70.7 Deg. F
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**Effluent Limitations for Organics [Pesticides]
Based upon Water Quality Standards**

In-stream criteria of downstream segments for Organics [Pesticides]
will be met with an effluent limit as follows:

	4 Day Average		1 Hour Average	
	Concentration	Load	Concentration	Load
Aldrin			1.5E+00 ug/l	2.91E-02 lbs/day
Chlordane	4.30E-03 ug/l	5.38E-02 lbs/day	1.2E+00 ug/l	2.33E-02 lbs/day
DDT, DDE	1.00E-03 ug/l	1.25E-02 lbs/day	5.5E-01 ug/l	1.07E-02 lbs/day
Dieldrin	1.90E-03 ug/l	2.38E-02 lbs/day	1.3E+00 ug/l	2.42E-02 lbs/day
Endosulfan	5.60E-02 ug/l	7.00E-01 lbs/day	1.1E-01 ug/l	2.13E-03 lbs/day
Endrin	2.30E-03 ug/l	2.88E-02 lbs/day	9.0E-02 ug/l	1.74E-03 lbs/day
Guthion	0.00E+00 ug/l	0.00E+00 lbs/day	1.0E-02 ug/l	1.94E-04 lbs/day
Heptachlor	3.80E-03 ug/l	4.75E-02 lbs/day	2.6E-01 ug/l	5.04E-03 lbs/day
Lindane	8.00E-02 ug/l	1.00E+00 lbs/day	1.0E+00 ug/l	1.94E-02 lbs/day
Methoxychlor	0.00E+00 ug/l	0.00E+00 lbs/day	3.0E-02 ug/l	5.82E-04 lbs/day
Mirex	0.00E+00 ug/l	0.00E+00 lbs/day	1.0E-02 ug/l	1.94E-04 lbs/day
Parathion	0.00E+00 ug/l	0.00E+00 lbs/day	4.0E-02 ug/l	7.75E-04 lbs/day
PCB's	1.40E-02 ug/l	1.75E-01 lbs/day	2.0E+00 ug/l	3.88E-02 lbs/day
Pentachlorophenol	1.30E+01 ug/l	1.63E+02 lbs/day	2.0E+01 ug/l	3.88E-01 lbs/day
Toxephene	2.00E-04 ug/l	2.50E-03 lbs/day	7.3E-01 ug/l	1.42E-02 lbs/day

**Utah Division of Water Quality
Salt Lake City, Utah**

**Effluent Targets for Pollution Indicators
Based upon Water Quality Standards**

In-stream criteria of downstream segments for Pollution Indicators will be met with an effluent limit as follows:

	1 Hour Average	
	Concentration	Loading
Gross Beta (pCi/l)	50.0 pCi/L	
BOD (mg/l)	5.0 mg/l	62.7 lbs/day
Nitrates as N	4.0 mg/l	50.1 lbs/day
Total Phosphorus as P	0.05 mg/l	0.6 lbs/day
Total Suspended Solids	90.0 mg/l	1127.9 lbs/day

Note: Pollution indicator targets are for information purposes only.

**Effluent Limitations for Protection of Human Health [Toxics Rule]
Based upon Water Quality Standards (Most stringent of 1C or 3A & 3B as appropriate.)**

In-stream criteria of downstream segments for Protection of Human Health [Toxics] will be met with an effluent limit as follows:

	Maximum Concentration	
	Concentration	Load
Toxic Organics		
Acenaphthene	6.19E+03 ug/l	7.74E+01 lbs/day
Acrolein	1.79E+03 ug/l	2.24E+01 lbs/day
Acrylonitrile	1.51E+00 ug/l	1.89E-02 lbs/day
Benzene	1.63E+02 ug/l	2.04E+00 lbs/day
Benzidine	ug/l	lbs/day
Carbon tetrachloride	1.01E+01 ug/l	1.26E-01 lbs/day
Chlorobenzene	4.81E+04 ug/l	6.02E+02 lbs/day
1,2,4-Trichlorobenzene		
Hexachlorobenzene	1.77E-03 ug/l	2.21E-05 lbs/day
1,2-Dichloroethane	2.27E+02 ug/l	2.84E+00 lbs/day
1,1,1-Trichloroethane		
Hexachloroethane	2.04E+01 ug/l	2.55E-01 lbs/day
1,1-Dichloroethane		
1,1,2-Trichloroethane	9.63E+01 ug/l	1.20E+00 lbs/day
1,1,2,2-Tetrachloroethane	2.52E+01 ug/l	3.15E-01 lbs/day
Chloroethane		
Bis(2-chloroethyl) ether	3.21E+00 ug/l	4.01E-02 lbs/day
2-Chloroethyl vinyl ether		
2-Chloronaphthalene	9.86E+03 ug/l	1.23E+02 lbs/day
2,4,6-Trichlorophenol	1.49E+01 ug/l	1.86E-01 lbs/day
p-Chloro-m-cresol		
Chloroform (HM)	1.08E+03 ug/l	1.35E+01 lbs/day
2-Chlorophenol	9.17E+02 ug/l	1.15E+01 lbs/day
1,2-Dichlorobenzene	3.90E+04 ug/l	4.88E+02 lbs/day
1,3-Dichlorobenzene	5.96E+03 ug/l	7.46E+01 lbs/day

**Utah Division of Water Quality
Salt Lake City, Utah**

1,4-Dichlorobenzene	5.96E+03 ug/l	7.46E+01 lbs/day
3,3'-Dichlorobenzidine	1.77E-01 ug/l	2.21E-03 lbs/day
1,1-Dichloroethylene	7.34E+00 ug/l	9.18E-02 lbs/day
1,2-trans-Dichloroethylene1		
2,4-Dichlorophenol	1.81E+03 ug/l	2.27E+01 lbs/day
1,2-Dichloropropane	8.94E+01 ug/l	1.12E+00 lbs/day
1,3-Dichloropropylene	3.90E+03 ug/l	4.88E+01 lbs/day
2,4-Dimethylphenol	5.27E+03 ug/l	6.60E+01 lbs/day
2,4-Dinitrotoluene	2.09E+01 ug/l	2.61E-01 lbs/day
2,6-Dinitrotoluene		
1,2-Diphenylhydrazine	1.24E+00 ug/l	1.55E-02 lbs/day
Ethylbenzene	6.65E+04 ug/l	8.32E+02 lbs/day
Fluoranthene	8.48E+02 ug/l	1.06E+01 lbs/day
4-Chlorophenyl phenyl ether		
4-Bromophenyl phenyl ether		
Bis(2-chloroisopropyl) ether	3.90E+05 ug/l	4.88E+03 lbs/day
Bis(2-chloroethoxy) methane		
Methylene chloride (HM)	3.67E+03 ug/l	4.59E+01 lbs/day
Methyl chloride (HM)		
Methyl bromide (HM)		
Bromoform (HM)	8.25E+02 ug/l	1.03E+01 lbs/day
Dichlorobromomethane(HM)	5.04E+01 ug/l	6.31E-01 lbs/day
Chlorodibromomethane (HM)	7.80E+01 ug/l	9.75E-01 lbs/day
Hexachlorocyclopentadiene	3.90E+04 ug/l	4.88E+02 lbs/day
Isophorone	1.38E+03 ug/l	1.72E+01 lbs/day
Naphthalene		
Nitrobenzene	4.36E+03 ug/l	5.45E+01 lbs/day
2-Nitrophenol		
4-Nitrophenol		
2,4-Dinitrophenol	3.21E+04 ug/l	4.01E+02 lbs/day
4,6-Dinitro-o-cresol	1.75E+03 ug/l	2.19E+01 lbs/day
N-Nitrosodimethylamine	1.86E+01 ug/l	2.32E-01 lbs/day
N-Nitrosodiphenylamine	3.67E+01 ug/l	4.59E-01 lbs/day
N-Nitrosodi-n-propylamine	3.21E+00 ug/l	4.01E-02 lbs/day
Pentachlorophenol	1.88E+01 ug/l	2.35E-01 lbs/day
Phenol	1.05E+07 ug/l	1.32E+05 lbs/day
Bis(2-ethylhexyl)phthalate	1.35E+01 ug/l	1.69E-01 lbs/day
Butyl benzyl phthalate	1.19E+04 ug/l	1.49E+02 lbs/day
Di-n-butyl phthalate	2.75E+04 ug/l	3.44E+02 lbs/day
Di-n-octyl phthlate		
Diethyl phthalate	2.75E+05 ug/l	3.44E+03 lbs/day
Dimethyl phthlate	6.65E+06 ug/l	8.32E+04 lbs/day
Benzo(a)anthracene (PAH)	7.11E-02 ug/l	8.89E-04 lbs/day
Benzo(a)pyrene (PAH)	7.11E-02 ug/l	8.89E-04 lbs/day
Benzo(b)fluoranthene (PAH)	7.11E-02 ug/l	8.89E-04 lbs/day
Benzo(k)fluoranthene (PAH)	7.11E-02 ug/l	8.89E-04 lbs/day
Chrysene (PAH)	7.11E-02 ug/l	8.89E-04 lbs/day
Acenaphthylene (PAH)		
Anthracene (PAH)		
Dibenzo(a,h)anthracene (PAH)	7.11E-02 ug/l	8.89E-04 lbs/day
Indeno(1,2,3-cd)pyrene (PAH)	7.11E-02 ug/l	8.89E-04 lbs/day

**Utah Division of Water Quality
Salt Lake City, Utah**

Pyrene (PAH)	2.52E+04 ug/l	3.15E+02 lbs/day
Tetrachloroethylene	2.04E+01 ug/l	2.55E-01 lbs/day
Toluene	4.59E+05 ug/l	5.74E+03 lbs/day
Trichloroethylene	1.86E+02 ug/l	2.32E+00 lbs/day
Vinyl chloride	1.20E+03 ug/l	1.51E+01 lbs/day

Pesticides

Aldrin	3.21E-04 ug/l	4.01E-06 lbs/day
Dieldrin	3.21E-04 ug/l	4.01E-06 lbs/day
Chlordane	1.35E-03 ug/l	1.69E-05 lbs/day
4,4'-DDT	1.35E-03 ug/l	1.69E-05 lbs/day
4,4'-DDE	1.35E-03 ug/l	1.69E-05 lbs/day
4,4'-DDD	1.93E-03 ug/l	2.41E-05 lbs/day
alpha-Endosulfan	4.59E+00 ug/l	5.74E-02 lbs/day
beta-Endosulfan	4.59E+00 ug/l	5.74E-02 lbs/day
Endosulfan sulfate	4.59E+00 ug/l	5.74E-02 lbs/day
Endrin	1.86E+00 ug/l	2.32E-02 lbs/day
Endrin aldehyde	1.86E+00 ug/l	2.32E-02 lbs/day
Heptachlor	4.81E-04 ug/l	6.02E-06 lbs/day
Heptachlor epoxide		

PCB's

PCB 1242 (Arochlor 1242)	1.03E-04 ug/l	1.29E-06 lbs/day
PCB-1254 (Arochlor 1254)	1.03E-04 ug/l	1.29E-06 lbs/day
PCB-1221 (Arochlor 1221)	1.03E-04 ug/l	1.29E-06 lbs/day
PCB-1232 (Arochlor 1232)	1.03E-04 ug/l	1.29E-06 lbs/day
PCB-1248 (Arochlor 1248)	1.03E-04 ug/l	1.29E-06 lbs/day
PCB-1260 (Arochlor 1260)	1.03E-04 ug/l	1.29E-06 lbs/day
PCB-1016 (Arochlor 1016)	1.03E-04 ug/l	1.29E-06 lbs/day

Pesticide

Toxaphene	1.72E-03 ug/l	2.15E-05 lbs/day
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Metals

Antimony	ug/l	lbs/day
Arsenic	ug/l	lbs/day
Asbestos	ug/l	lbs/day
Beryllium		
Cadmium		
Chromium (III)		
Chromium (VI)		
Copper	ug/l	lbs/day
Cyanide	ug/l	lbs/day
Lead		
Mercury	ug/l	lbs/day
Nickel	ug/l	lbs/day
Selenium		
Silver		
Thallium	ug/l	lbs/day
Zinc		

**Utah Division of Water Quality
Salt Lake City, Utah**

Dioxin

Dioxin (2,3,7,8-TCDD)

3.21E-08 ug/l

4.01E-10 lbs/day

**Metals Effluent Limitations for Protection of All Beneficial Uses
Based upon Water Quality Standards and Toxics Rule**

	Class 4 Acute Agricultural ug/l	Class 3 Acute Aquatic Wildlife ug/l	Acute Toxics Drinking Water Source ug/l	Acute Toxics Wildlife ug/l	1C Acute Health Criteria ug/l	Acute Most Stringent ug/l	Class 3 Chronic Aquatic Wildlife ug/l
Aluminum		1233.3				1233.3	N/A
Antimony				9859.1		9859.1	
Arsenic	229.3	559.3			0.0	229.3	434.6
Barium						0.0	
Beryllium						0.0	
Cadmium	22.8	17.3			0.0	17.3	1.9
Chromium (III)		10755.1			0.0	10755.1	714.9
Chromium (VI)	228.3	23.8			0.0	23.77	20.08
Copper	457.5	100.8				100.8	80.9
Cyanide		36.2	504421.5			36.2	11.9
Iron		1645.6				1645.6	
Lead	228.3	993.7			0.0	228.3	52.9
Mercury		3.95		0.34	0.0	0.34	0.028
Nickel		2919.6		10547.0		2919.6	451.1
Selenium	112.6	31.9			0.0	31.9	8.5
Silver		93.0			0.0	93.0	
Thallium				14.4		14.4	
Zinc		747.2				747.2	1040.5
Boron	1719.6					1719.6	

Summary Effluent Limitations for Metals [Wasteload Allocation, TMDL]

[If Acute is more stringent than Chronic, then the Chronic takes on the Acute value.]

	WLA Acute ug/l	WLA Chronic ug/l	
Aluminum	1233.3	N/A	
Antimony	9859.15		
Arsenic	229.3	434.6	Acute Controls
Asbestos	0.00E+00		
Barium			
Beryllium			
Cadmium	17.3	1.9	
Chromium (III)	10755.1	715	
Chromium (VI)	23.8	20.1	
Copper	100.8	80.9	

**Utah Division of Water Quality
Salt Lake City, Utah**

Cyanide	36.2	11.9	
Iron	1645.6		
Lead	228.3	52.9	
Mercury	0.344	0.028	
Nickel	2919.6	451	
Selenium	31.9	8.5	
Silver	93.0	N/A	
Thallium	14.4		
Zinc	747.2	1040.5	Acute Controls
Boron	1719.62		

Other Effluent Limitations are based upon R317-1.

E. coli 126.0 organisms per 100 ml

X. Antidegradation Considerations

The Utah Antidegradation Policy allows for degradation of existing quality where it is determined that such lowering of water quality is necessary to accommodate important economic or social development in the area in which the waters are protected [R317-2-3]. It has been determined that certain chemical parameters introduced by this discharge will cause an increase of the concentration of said parameters in the receiving waters. Under no conditions will the increase in concentration be allowed to interfere with existing instream water uses.

The antidegradation rules and procedures allow for modification of effluent limits less than those based strictly upon mass balance equations utilizing 100% of the assimilative capacity of the receiving water. Additional factors include considerations for "Blue-ribbon" fisheries, special recreational areas, threatened and endangered species, and drinking water sources.

An Antidegradation Level I Review was conducted on this discharge and its effect on the receiving water. Based upon that review, it has been determined that an Antidegradation Level II Review is not required. Basic renewal, no increase in effluent flow or concentration.

XI. Colorado River Salinity Forum Considerations

Discharges in the Colorado River Basin are required to have their discharge at a TDS loading of less than 1.00 tons/day unless certain exemptions apply. Refer to the Forum's Guidelines for additional information allowing for an exceedence of this value.

XII. Summary Comments

The mathematical modeling and best professional judgement indicate that violations of receiving water beneficial uses with their associated water quality standards, including important downstream segments, will not occur for the evaluated parameters of concern as discussed above if the effluent limitations indicated above are met.

**Utah Division of Water Quality
Salt Lake City, Utah**

XIII. Notice of UPDES Requirement

This Addendum to the Statement of Basis does not authorize any entity or party to discharge to the waters of the State of Utah. That authority is granted through a UPDES permit issued by the Utah Division of Water Quality. The numbers presented here may be changed as a function of other factors. Dischargers are strongly urged to contact the Permits Section for further information. Permit writers may utilize other information to adjust these limits and/or to determine other limits based upon best available technology and other considerations provided that the values in this wasteload analysis [TMDL] are not compromised. See special provisions in Utah Water Quality Standards for adjustments in the Total Dissolved Solids values based upon background concentration.

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Salt Lake City, Utah**

Antidegradation Review

An antidegradation review (ADR) was conducted to determine whether the proposed activity complies with the applicable antidegradation requirements for receiving waters that may be affected. The Level I ADR evaluated the criteria of R317-2-3.5(b) and determined that the proposed discharge will not require a Level II Antidegradation Review. The proposed permit is a simple renewal. No increase in effluent flow or concentration.

WASTELOAD ANALYSIS [WLA]
Addendum: Statement of Basis
SUMMARY

Wasteload Applicable for Non-Irrigation Season (October-March)

Discharging Facility: Western Energy Operating

UPDES No: UT-0021768

Current Flow: 1.50 MGD Design Flow

Design Flow 1.50 MGD

Receiving Water: Union Canal => Ashley Creek

Stream Classification: 2B, 3B, 4

Stream Flows [cfs]: 13.40 Non-irrigation 20th Percentile

Stream TDS Values: 1766.0 Non-irrigation Average

Effluent Limits:

Flow, MGD: 1.50 MGD Design Flow

BOD, mg/l: 25.0 Non-irrigation 5.0 Indicator

Dissolved Oxygen, mg/l 4.0 Non-irrigation 5.5 30 Day Average

TNH₃, Chronic, mg/l: 15.0 Non-irrigation Varies Function of pH and Temperature

TDS, mg/l: 1200.0 Non-irrigation 1200.0

WQ Standard:

Modeling Parameters:

Acute River Width: 50.0%

Chronic River Width: 100.0%

Level 1 Antidegradation Level Completed: Level II Review not required.

Date: 7/24/2014

Permit Writer:

WLA by:

WQM Sec. Approval:

TMDL Sec. Approval:

FILE COPY

Utah Division of Water Quality
Salt Lake City, Utah

WASTELOAD ANALYSIS [WLA]
Addendum: Statement of Basis

24-Jul-14
4:00 PM

Facilities: Western Energy Operating
Discharging to: Union Canal => Ashley Creek

UPDES No: UT-0021768

I. Introduction

Wasteload analyses are performed to determine point source effluent limitations necessary to maintain designated beneficial uses by evaluating projected effects of discharge concentrations on in-stream water quality. The wasteload analysis also takes into account downstream designated uses [R317-2-8, UAC]. Projected concentrations are compared to numeric water quality standards to determine acceptability. The anti-degradation policy and procedures are also considered. The primary in-stream parameters of concern may include metals (as a function of hardness), total dissolved solids (TDS), total residual chlorine (TRC), un-ionized ammonia (as a function of pH and temperature, measured and evaluated in terms of total ammonia), and dissolved oxygen.

Mathematical water quality modeling is employed to determine stream quality response to point source discharges. Models aid in the effort of anticipating stream quality at future effluent flows at critical environmental conditions (e.g., low stream flow, high temperature, high pH, etc).

The numeric criteria in this wasteload analysis may always be modified by narrative criteria and other conditions determined by staff of the Division of Water Quality.

II. Receiving Water and Stream Classification

Union Canal => Ashley Creek:	2B, 3B, 4
Antidegradation Review:	Level I review completed. Level II review not required.

III. Numeric Stream Standards for Protection of Aquatic Wildlife

Total Ammonia (TNH3)	Varies as a function of Temperature and pH Rebound. See Water Quality Standards
Chronic Total Residual Chlorine (TRC)	0.011 mg/l (4 Day Average) 0.019 mg/l (1 Hour Average)
Chronic Dissolved Oxygen (DO)	5.50 mg/l (30 Day Average) 4.00 mg/l (7Day Average) 3.00 mg/l (1 Day Average)
Maximum Total Dissolved Solids	1200.0 mg/l

**Utah Division of Water Quality
Salt Lake City, Utah**

Acute and Chronic Heavy Metals (Dissolved)

Parameter	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard		
	Concentration	Load*	Concentration		Load*
Aluminum	87.00 ug/l**	1.090 lbs/day	750.00	ug/l	9.399 lbs/day
Arsenic	190.00 ug/l	2.381 lbs/day	340.00	ug/l	4.261 lbs/day
Cadmium	0.99 ug/l	0.012 lbs/day	12.62	ug/l	0.158 lbs/day
Chromium III	360.78 ug/l	4.521 lbs/day	7548.22	ug/l	94.592 lbs/day
Chromium VI	11.00 ug/l	0.138 lbs/day	16.00	ug/l	0.201 lbs/day
Copper	41.56 ug/l	0.521 lbs/day	72.69	ug/l	0.911 lbs/day
Iron			1000.00	ug/l	12.532 lbs/day
Lead	29.46 ug/l	0.369 lbs/day	755.92	ug/l	9.473 lbs/day
Mercury	0.0120 ug/l	0.000 lbs/day	2.40	ug/l	0.030 lbs/day
Nickel	228.93 ug/l	2.869 lbs/day	2059.07	ug/l	25.804 lbs/day
Selenium	4.60 ug/l	0.058 lbs/day	20.00	ug/l	0.251 lbs/day
Silver	N/A ug/l	N/A lbs/day	76.55	ug/l	0.959 lbs/day
Zinc	527.04 ug/l	6.605 lbs/day	527.04	ug/l	6.605 lbs/day

* Allowed below discharge

**Chronic Aluminum standard applies only to waters with a pH < 7.0 and a Hardness < 50 mg/l as CaCO₃

Metals Standards Based upon a Hardness of 574.47 mg/l as CaCO₃

Organics [Pesticides]

Parameter	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard		
	Concentration	Load*	Concentration		Load*
Aldrin			1.500	ug/l	0.019 lbs/day
Chlordane	0.004 ug/l	0.364 lbs/day	1.200	ug/l	0.015 lbs/day
DDT, DDE	0.001 ug/l	0.085 lbs/day	0.550	ug/l	0.007 lbs/day
Dieldrin	0.002 ug/l	0.161 lbs/day	1.250	ug/l	0.016 lbs/day
Endosulfan	0.056 ug/l	4.745 lbs/day	0.110	ug/l	0.001 lbs/day
Endrin	0.002 ug/l	0.195 lbs/day	0.090	ug/l	0.001 lbs/day
Guthion			0.010	ug/l	0.000 lbs/day
Heptachlor	0.004 ug/l	0.322 lbs/day	0.260	ug/l	0.003 lbs/day
Lindane	0.080 ug/l	6.779 lbs/day	1.000	ug/l	0.013 lbs/day
Methoxychlor			0.030	ug/l	0.000 lbs/day
Mirex			0.010	ug/l	0.000 lbs/day
Parathion			0.040	ug/l	0.001 lbs/day
PCB's	0.014 ug/l	1.186 lbs/day	2.000	ug/l	0.025 lbs/day
Pentachlorophenol	13.00 ug/l	1101.535 lbs/day	20.000	ug/l	0.251 lbs/day
Toxephene	0.0002 ug/l	0.017 lbs/day	0.7300	ug/l	0.009 lbs/day

**Utah Division of Water Quality
Salt Lake City, Utah**

IV. Numeric Stream Standards for Protection of Agriculture

	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
	Concentration	Load*	Concentration	Load*
Arsenic			100.0 ug/l	lbs/day
Boron			750.0 ug/l	lbs/day
Cadmium			10.0 ug/l	0.06 lbs/day
Chromium			100.0 ug/l	lbs/day
Copper			200.0 ug/l	lbs/day
Lead			100.0 ug/l	lbs/day
Selenium			50.0 ug/l	lbs/day
TDS, Summer			1200.0 mg/l	7.52 tons/day

V. Numeric Stream Standards for Protection of Human Health (Class 1C Waters)

	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
	Concentration	Load*	Concentration	Load*
Metals				
Arsenic			ug/l	lbs/day
Barium			ug/l	lbs/day
Cadmium			ug/l	lbs/day
Chromium			ug/l	lbs/day
Lead			ug/l	lbs/day
Mercury			ug/l	lbs/day
Selenium			ug/l	lbs/day
Silver			ug/l	lbs/day
Fluoride (3)			ug/l	lbs/day
to			ug/l	lbs/day
Nitrates as N			ug/l	lbs/day

Chlorophenoxy Herbicides

2,4-D	ug/l	lbs/day
2,4,5-TP	ug/l	lbs/day
Endrin	ug/l	lbs/day
gamma-cyhalothrin (Lindane)	ug/l	lbs/day
Methoxychlor	ug/l	lbs/day
Toxaphene	ug/l	lbs/day

VI. Numeric Stream Standards the Protection of Human Health from Water & Fish Consumption [Toxics]

Toxic Organics	Maximum Conc., ug/l - Acute Standards			
	Class 1C		Class 3A, 3B	
	[2 Liters/Day for 70 Kg Person over 70 Yr.]		[6.5 g for 70 Kg Person over 70 Yr.]	
Acenaphthene	ug/l	lbs/day	2700.0 ug/l	228.78 lbs/day
Acrolein	ug/l	lbs/day	780.0 ug/l	66.09 lbs/day
Acrylonitrile	ug/l	lbs/day	0.7 ug/l	0.06 lbs/day
Benzene	ug/l	lbs/day	71.0 ug/l	6.02 lbs/day
Benzidine	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Carbon tetrachloride	ug/l	lbs/day	4.4 ug/l	0.37 lbs/day
Chlorobenzene	ug/l	lbs/day	21000.0 ug/l	1779.40 lbs/day
1,2,4-Trichlorobenzene				
Hexachlorobenzene	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
1,2-Dichloroethane	ug/l	lbs/day	99.0 ug/l	8.39 lbs/day

**Utah Division of Water Quality
Salt Lake City, Utah**

1,1,1-Trichloroethane				
Hexachloroethane	ug/l	lbs/day	8.9 ug/l	0.75 lbs/day
1,1-Dichloroethane				
1,1,2-Trichloroethane	ug/l	lbs/day	42.0 ug/l	3.56 lbs/day
1,1,2,2-Tetrachloroethane	ug/l	lbs/day	11.0 ug/l	0.93 lbs/day
Chloroethane			0.0 ug/l	0.00 lbs/day
Bis(2-chloroethyl) ether	ug/l	lbs/day	1.4 ug/l	0.12 lbs/day
2-Chloroethyl vinyl ether	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
2-Chloronaphthalene	ug/l	lbs/day	4300.0 ug/l	364.35 lbs/day
2,4,6-Trichlorophenol	ug/l	lbs/day	6.5 ug/l	0.55 lbs/day
p-Chloro-m-cresol			0.0 ug/l	0.00 lbs/day
Chloroform (HM)	ug/l	lbs/day	470.0 ug/l	39.82 lbs/day
2-Chlorophenol	ug/l	lbs/day	400.0 ug/l	33.89 lbs/day
1,2-Dichlorobenzene	ug/l	lbs/day	17000.0 ug/l	1440.47 lbs/day
1,3-Dichlorobenzene	ug/l	lbs/day	2600.0 ug/l	220.31 lbs/day
1,4-Dichlorobenzene	ug/l	lbs/day	2600.0 ug/l	220.31 lbs/day
3,3'-Dichlorobenzidine	ug/l	lbs/day	0.1 ug/l	0.01 lbs/day
1,1-Dichloroethylene	ug/l	lbs/day	3.2 ug/l	0.27 lbs/day
1,2-trans-Dichloroethylene	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
2,4-Dichlorophenol	ug/l	lbs/day	790.0 ug/l	66.94 lbs/day
1,2-Dichloropropane	ug/l	lbs/day	39.0 ug/l	3.30 lbs/day
1,3-Dichloropropylene	ug/l	lbs/day	1700.0 ug/l	144.05 lbs/day
2,4-Dimethylphenol	ug/l	lbs/day	2300.0 ug/l	194.89 lbs/day
2,4-Dinitrotoluene	ug/l	lbs/day	9.1 ug/l	0.77 lbs/day
2,6-Dinitrotoluene	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
1,2-Diphenylhydrazine	ug/l	lbs/day	0.5 ug/l	0.05 lbs/day
Ethylbenzene	ug/l	lbs/day	29000.0 ug/l	2457.27 lbs/day
Fluoranthene	ug/l	lbs/day	370.0 ug/l	31.35 lbs/day
4-Chlorophenyl phenyl ether				
4-Bromophenyl phenyl ether				
Bis(2-chloroisopropyl) ether	ug/l	lbs/day	170000.0 ug/l	14404.69 lbs/day
Bis(2-chloroethoxy) methane	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Methylene chloride (HM)	ug/l	lbs/day	1600.0 ug/l	135.57 lbs/day
Methyl chloride (HM)	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Methyl bromide (HM)	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Bromoform (HM)	ug/l	lbs/day	360.0 ug/l	30.50 lbs/day
Dichlorobromomethane	ug/l	lbs/day	22.0 ug/l	1.86 lbs/day
Chlorodibromomethane	ug/l	lbs/day	34.0 ug/l	2.88 lbs/day
Hexachlorobutadiene(c)	ug/l	lbs/day	50.0 ug/l	4.24 lbs/day
Hexachlorocyclopentadiene	ug/l	lbs/day	17000.0 ug/l	1440.47 lbs/day
Isophorone	ug/l	lbs/day	600.0 ug/l	50.84 lbs/day
Naphthalene				
Nitrobenzene	ug/l	lbs/day	1900.0 ug/l	160.99 lbs/day
2-Nitrophenol	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
4-Nitrophenol	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
2,4-Dinitrophenol	ug/l	lbs/day	14000.0 ug/l	1186.27 lbs/day
4,6-Dinitro-o-cresol	ug/l	lbs/day	765.0 ug/l	64.82 lbs/day
N-Nitrosodimethylamine	ug/l	lbs/day	8.1 ug/l	0.69 lbs/day
N-Nitrosodiphenylamine	ug/l	lbs/day	16.0 ug/l	1.36 lbs/day
N-Nitrosodi-n-propylamine	ug/l	lbs/day	1.4 ug/l	0.12 lbs/day
Pentachlorophenol	ug/l	lbs/day	8.2 ug/l	0.69 lbs/day

Utah Division of Water Quality
Salt Lake City, Utah

Phenol	ug/l	lbs/day	4.6E+06 ug/l	3.90E+05 lbs/day
Bis(2-ethylhexyl)phthala	ug/l	lbs/day	5.9 ug/l	0.50 lbs/day
Butyl benzyl phthalate	ug/l	lbs/day	5200.0 ug/l	440.61 lbs/day
Di-n-butyl phthalate	ug/l	lbs/day	12000.0 ug/l	1016.80 lbs/day
Di-n-octyl phthlate				
Diethyl phthalate	ug/l	lbs/day	120000.0 ug/l	10168.02 lbs/day
Dimethyl phthlate	ug/l	lbs/day	2.9E+06 ug/l	2.46E+05 lbs/day
Benzo(a)anthracene (P/	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Benzo(a)pyrene (PAH)	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Benzo(b)fluoranthene (F	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Benzo(k)fluoranthene (F	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Chrysene (PAH)	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Acenaphthylene (PAH)				
Anthracene (PAH)	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Dibenzo(a,h)anthracene	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Indeno(1,2,3-cd)pyrene	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Pyrene (PAH)	ug/l	lbs/day	11000.0 ug/l	932.07 lbs/day
Tetrachloroethylene	ug/l	lbs/day	8.9 ug/l	0.75 lbs/day
Toluene	ug/l	lbs/day	200000 ug/l	16946.70 lbs/day
Trichloroethylene	ug/l	lbs/day	81.0 ug/l	6.86 lbs/day
Vinyl chloride	ug/l	lbs/day	525.0 ug/l	44.49 lbs/day
				lbs/day
Pesticides				lbs/day
Aldrin	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Dieldrin	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Chlordane	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDT	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDE	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDD	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
alpha-Endosulfan	ug/l	lbs/day	2.0 ug/l	0.17 lbs/day
beta-Endosulfan	ug/l	lbs/day	2.0 ug/l	0.17 lbs/day
Endosulfan sulfate	ug/l	lbs/day	2.0 ug/l	0.17 lbs/day
Endrin	ug/l	lbs/day	0.8 ug/l	0.07 lbs/day
Endrin aldehyde	ug/l	lbs/day	0.8 ug/l	0.07 lbs/day
Heptachlor	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Heptachlor epoxide				
PCB's				
PCB 1242 (Arochlor 124	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1254 (Arochlor 125	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1221 (Arochlor 122	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1232 (Arochlor 123	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1248 (Arochlor 124	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1260 (Arochlor 126	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1016 (Arochlor 101	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Pesticide				
Toxaphene	ug/l		0.0 ug/l	0.00 lbs/day
Dioxin				
Dioxin (2,3,7,8-TCDD)	ug/l	lbs/day		

**Utah Division of Water Quality
Salt Lake City, Utah**

Metals

Antimony	ug/l	lbs/day		
Arsenic	ug/l	lbs/day	4300.00 ug/l	364.35 lbs/day
Asbestos	ug/l	lbs/day		
Beryllium				
Cadmium				
Chromium (III)				
Chromium (VI)				
Copper				
Cyanide	ug/l	lbs/day	2.2E+05 ug/l	18641.37 lbs/day
Lead	ug/l	lbs/day		
Mercury			0.15 ug/l	0.01 lbs/day
Nickel			4600.00 ug/l	389.77 lbs/day
Selenium	ug/l	lbs/day		
Silver	ug/l	lbs/day		
Thallium			6.30 ug/l	0.53 lbs/day
Zinc				

There are additional standards that apply to this receiving water, but were not considered in this modeling/waste load allocation analysis.

VII. Mathematical Modeling of Stream Quality

Model configuration was accomplished utilizing standard modeling procedures. Data points were plotted and coefficients adjusted as required to match observed data as closely as possible.

The modeling approach used in this analysis included one or a combination of the following models.

(1) The Utah River Model, Utah Division of Water Quality, 1992. Based upon STREAMDO IV (Region VIII) and Supplemental Ammonia Toxicity Models; EPA Region VIII, Sept. 1990 and QUAL2E (EPA, Athens, GA).

(2) Utah Ammonia/Chlorine Model, Utah Division of Water Quality, 1992.

(3) AMMTOX Model, University of Colorado, Center of Limnology, and EPA Region 8

(4) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al. Harper Collins Publisher, Inc. 1987, pp. 644.

Coefficients used in the model were based, in part, upon the following references:

(1) Rates, Constants, and Kinetics Formulations in Surface Water Quality Modeling. Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Athens Georgia. EPA/600/3-85/040 June 1985.

**Utah Division of Water Quality
Salt Lake City, Utah**

(2) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al.
Harper Collins Publisher, Inc. 1987, pp. 644.

VIII. Modeling Information

The required information for the model may include the following information for both the upstream conditions at low flow and the effluent conditions:

Flow, Q, (cfs or MGD)	D.O. mg/l
Temperature, Deg. C.	Total Residual Chlorine (TRC), mg/l
pH	Total NH3-N, mg/l
BOD5, mg/l	Total Dissolved Solids (TDS), mg/l
Metals, ug/l	Toxic Organics of Concern, ug/l

Other Conditions

In addition to the upstream and effluent conditions, the models require a variety of physical and biological coefficients and other technical information. In the process of actually establishing the permit limits for an effluent, values are used based upon the available data, model calibration, literature values, site visits and best professional judgement.

Model Inputs

The following is upstream and discharge information that was utilized as inputs for the analysis. Dry washes are considered to have an upstream flow equal to the flow of the discharge.

Current Upstream Information

	Stream		pH	T-NH3 mg/l as N	BOD5 mg/l	DO mg/l	TRC mg/l	TDS mg/l
	Flow cfs	Temp. Deg. C						
Summer (Irrig. Season)	13.40	3.9	8.1	0.01	0.05	9.89	0.00	1766.0
Fall	13.40	3.9	8.1	0.01	0.05	---	0.00	1766.0
Winter	13.40	3.9	8.1	0.01	0.05	---	0.00	1766.0
Spring	13.40	3.9	8.1	0.01	0.05	---	0.00	1766.0
Dissolved Metals	Al ug/l	As ug/l	Cd ug/l	CrIII ug/l	CrVI ug/l	Copper ug/l	Fe ug/l	Pb ug/l
All Seasons	1.59*	0.53*	0.053*	0.53*	2.65*	0.53*	0.83*	0.53*
Dissolved Metals	Hg ug/l	Ni ug/l	Se ug/l	Ag ug/l	Zn ug/l	Boron ug/l	* 1/2 MDL	
All Seasons	0.0000	0.53*	1.06*	0.1*	0.053*	10.0		

**Utah Division of Water Quality
Salt Lake City, Utah**

Projected Discharge Information

Season	Flow, MGD	Temp.	TDS mg/l	TDS tons/day
non-irrigation	1.50000	19.1	1250.00	7.81718

All model numerical inputs, intermediate calculations, outputs and graphs are available for discussion, inspection and copy at the Division of Water Quality.

IX. Effluent Limitations

Current State water quality standards are required to be met under a variety of conditions including in-stream flows targeted to the 7-day, 10-year low flow (R317-2-9).

Other conditions used in the modeling effort coincide with the environmental conditions expected at low stream flows.

Effluent Limitation for Flow based upon Water Quality Standards

In-stream criteria of downstream segments will be met with an effluent flow maximum value as follows:

Season	Daily Average	
non-irrigation	1.500 MGD	2.321 cfs

Flow Requirement or Loading Requirement

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 1.5 MGD. If the discharger is allowed to have a flow greater than 1.5 MGD during 7Q10 conditions, and effluent limit concentrations as indicated, then water quality standards will be violated. In order to prevent this from occurring, the permit writers must include the discharge flow limitation as indicated above; or, include loading effluent limits in the permit.

Effluent Limitation for Whole Effluent Toxicity (WET) based upon WET Policy

Effluent Toxicity will not occur in downstream segments if the values below are met.

WET Requirements	LC50 >	115.4% Effluent	[Acute]
	IC25 >	14.8% Effluent	[Chronic]

**Utah Division of Water Quality
Salt Lake City, Utah**

Effluent Limitation for Biological Oxygen Demand (BOD) based upon Water Quality Standards or Regulations

In-stream criteria of downstream segments for Dissolved Oxygen will be met with an effluent BOD limitation as follows:

Season	Concentration	
non-irrigation	25.0 mg/l as BOD5	312.7 lbs/day

Effluent Limitation for Dissolved Oxygen (DO) based upon Water Quality Standards

In-stream criteria of downstream segments for Dissolved Oxygen will be met with an effluent D.O. limitation as follows:

Season	Concentration
non-irrigation	4.00

Effluent Limitation for Total Ammonia based upon Water Quality Standards

In-stream criteria of downstream segments for Total Ammonia will be met with an effluent limitation (expressed as Total Ammonia as N) as follows:

Season		Concentration	Load
non-irrigation	4 Day Avg. - Chronic	15.0 mg/l as N	188.0 lbs/day
	1 Hour Avg. - Acute	21.8 mg/l as N	273.0 lbs/day

Acute limit calculated with an Acute Zone of Initial Dilution (ZID) to be equal to 50.%.

**Utah Division of Water Quality
Salt Lake City, Utah**

Effluent Limitation for Total Residual Chlorine based upon Water Quality Standards

In-stream criteria of downstream segments for Total Residual Chlorine will be met with an effluent limitation as follows:

Season	Concentration	Load
non-irrigation 4 Day Avg. - Chronic	0.069 mg/l	0.86 lbs/day
1 Hour Avg. - Acute	0.071 mg/l	0.89 lbs/day

Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards

Season	Concentration	Load
non-irrigation Maximum, Acute	1200.0 mg/l	7.50 tons/day

Ashley Creek is listed on Utah's 303(d) list as impaired for TDS (2010)
No assimilative capacity exists for this pollutant. Effluent limit equals the standard.

Colorado Salinity Forum Limits Determined by Permitting Section

Effluent Limitations for Hydrogen Sulfide (undissociated) based upon Water Quality Standards

Season	Concentration	Load
non-irrigation Maximum, Acute	7.8 mg/l	0.03 tons/day

Effluent Limitations for Total Recoverable Metals based upon Water Quality Standards

In-stream criteria of downstream segments for Dissolved Metals will be met with an effluent limitation as follows (based upon a hardness of 574.47 mg/l):

	4 Day Average Concentration	Load	1 Hour Average Concentration	Load
Aluminum*	N/A	N/A	2,908.6 ug/l	36.4 lbs/day
Arsenic*	1,282.59 ug/l	10.4 lbs/day	1,319.4 ug/l	16.5 lbs/day
Cadmium	6.24 ug/l	0.1 lbs/day	48.8 ug/l	0.6 lbs/day
Chromium III	2,439.56 ug/l	19.7 lbs/day	29,340.0 ug/l	367.7 lbs/day

**Utah Division of Water Quality
Salt Lake City, Utah**

Chromium VI*	51.57 ug/l	0.4 lbs/day	50.7	ug/l	0.6 lbs/day
Copper	276.93 ug/l	2.2 lbs/day	280.3	ug/l	3.5 lbs/day
Iron*	N/A	N/A	3,883.7	ug/l	48.7 lbs/day
Lead	194.97 ug/l	1.6 lbs/day	2,936.2	ug/l	36.8 lbs/day
Mercury*	0.08 ug/l	0.0 lbs/day	9.3	ug/l	0.1 lbs/day
Nickel	1,546.32 ug/l	12.5 lbs/day	8,002.0	ug/l	100.3 lbs/day
Selenium*	21.98 ug/l	0.2 lbs/day	73.2	ug/l	0.9 lbs/day
Silver	N/A ug/l	N/A lbs/day	297.6	ug/l	3.7 lbs/day
Zinc	3,570.02 ug/l	28.9 lbs/day	2,048.5	ug/l	25.7 lbs/day
Cyanide*	35.23 ug/l	0.3 lbs/day	85.5	ug/l	1.1 lbs/day

*Limits for these metals are based on the dissolved standard.

**Effluent Limitations for Heat/Temperature based upon
Water Quality Standards**

non-irrigation	11.7 Deg. C.	53.0 Deg. F
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**Effluent Limitations for Organics [Pesticides]
Based upon Water Quality Standards**

In-stream criteria of downstream segments for Organics [Pesticides]
will be met with an effluent limit as follows:

	4 Day Average		1 Hour Average	
	Concentration	Load	Concentration	Load
Aldrin			1.5E+00 ug/l	2.91E-02 lbs/day
Chlordane	4.30E-03 ug/l	5.38E-02 lbs/day	1.2E+00 ug/l	2.33E-02 lbs/day
DDT, DDE	1.00E-03 ug/l	1.25E-02 lbs/day	5.5E-01 ug/l	1.07E-02 lbs/day
Dieldrin	1.90E-03 ug/l	2.38E-02 lbs/day	1.3E+00 ug/l	2.42E-02 lbs/day
Endosulfan	5.60E-02 ug/l	7.00E-01 lbs/day	1.1E-01 ug/l	2.13E-03 lbs/day
Endrin	2.30E-03 ug/l	2.88E-02 lbs/day	9.0E-02 ug/l	1.74E-03 lbs/day
Guthion	0.00E+00 ug/l	0.00E+00 lbs/day	1.0E-02 ug/l	1.94E-04 lbs/day
Heptachlor	3.80E-03 ug/l	4.75E-02 lbs/day	2.6E-01 ug/l	5.04E-03 lbs/day
Lindane	8.00E-02 ug/l	1.00E+00 lbs/day	1.0E+00 ug/l	1.94E-02 lbs/day
Methoxychlor	0.00E+00 ug/l	0.00E+00 lbs/day	3.0E-02 ug/l	5.82E-04 lbs/day
Mirex	0.00E+00 ug/l	0.00E+00 lbs/day	1.0E-02 ug/l	1.94E-04 lbs/day
Parathion	0.00E+00 ug/l	0.00E+00 lbs/day	4.0E-02 ug/l	7.75E-04 lbs/day
PCB's	1.40E-02 ug/l	1.75E-01 lbs/day	2.0E+00 ug/l	3.88E-02 lbs/day
Pentachlorophenol	1.30E+01 ug/l	1.63E+02 lbs/day	2.0E+01 ug/l	3.88E-01 lbs/day
Toxephene	2.00E-04 ug/l	2.50E-03 lbs/day	7.3E-01 ug/l	1.42E-02 lbs/day

**Utah Division of Water Quality
Salt Lake City, Utah**

**Effluent Targets for Pollution Indicators
Based upon Water Quality Standards**

In-stream criteria of downstream segments for Pollution Indicators will be met with an effluent limit as follows:

	1 Hour Average	
	Concentration	Loading
Gross Beta (pCi/l)	50.0 pCi/L	
BOD (mg/l)	5.0 mg/l	62.7 lbs/day
Nitrates as N	4.0 mg/l	50.1 lbs/day
Total Phosphorus as P	0.05 mg/l	0.6 lbs/day
Total Suspended Solids	90.0 mg/l	1127.9 lbs/day

Note: Pollution indicator targets are for information purposes only.

**Effluent Limitations for Protection of Human Health [Toxics Rule]
Based upon Water Quality Standards (Most stringent of 1C or 3A & 3B as appropriate.)**

In-stream criteria of downstream segments for Protection of Human Health [Toxics] will be met with an effluent limit as follows:

	Maximum Concentration	
	Concentration	Load
Toxic Organics		
Acenaphthene	1.83E+04 ug/l	2.29E+02 lbs/day
Acrolein	5.28E+03 ug/l	6.61E+01 lbs/day
Acrylonitrile	4.47E+00 ug/l	5.59E-02 lbs/day
Benzene	4.81E+02 ug/l	6.02E+00 lbs/day
Benzidine	ug/l	lbs/day
Carbon tetrachloride	2.98E+01 ug/l	3.73E-01 lbs/day
Chlorobenzene	1.42E+05 ug/l	1.78E+03 lbs/day
1,2,4-Trichlorobenzene		
Hexachlorobenzene	5.22E-03 ug/l	6.52E-05 lbs/day
1,2-Dichloroethane	6.71E+02 ug/l	8.39E+00 lbs/day
1,1,1-Trichloroethane		
Hexachloroethane	6.03E+01 ug/l	7.54E-01 lbs/day
1,1-Dichloroethane		
1,1,2-Trichloroethane	2.85E+02 ug/l	3.56E+00 lbs/day
1,1,2,2-Tetrachloroethane	7.45E+01 ug/l	9.32E-01 lbs/day
Chloroethane		
Bis(2-chloroethyl) ether	9.48E+00 ug/l	1.19E-01 lbs/day
2-Chloroethyl vinyl ether		
2-Chloronaphthalene	2.91E+04 ug/l	3.64E+02 lbs/day
2,4,6-Trichlorophenol	4.40E+01 ug/l	5.51E-01 lbs/day
p-Chloro-m-cresol		
Chloroform (HM)	3.18E+03 ug/l	3.98E+01 lbs/day
2-Chlorophenol	2.71E+03 ug/l	3.39E+01 lbs/day
1,2-Dichlorobenzene	1.15E+05 ug/l	1.44E+03 lbs/day
1,3-Dichlorobenzene	1.76E+04 ug/l	2.20E+02 lbs/day

**Utah Division of Water Quality
Salt Lake City, Utah**

1,4-Dichlorobenzene	1.76E+04 ug/l	2.20E+02 lbs/day
3,3'-Dichlorobenzidine	5.22E-01 ug/l	6.52E-03 lbs/day
1,1-Dichloroethylene	2.17E+01 ug/l	2.71E-01 lbs/day
1,2-trans-Dichloroethylene1		
2,4-Dichlorophenol	5.35E+03 ug/l	6.69E+01 lbs/day
1,2-Dichloropropane	2.64E+02 ug/l	3.30E+00 lbs/day
1,3-Dichloropropylene	1.15E+04 ug/l	1.44E+02 lbs/day
2,4-Dimethylphenol	1.56E+04 ug/l	1.95E+02 lbs/day
2,4-Dinitrotoluene	6.16E+01 ug/l	7.71E-01 lbs/day
2,6-Dinitrotoluene		
1,2-Diphenylhydrazine	3.66E+00 ug/l	4.58E-02 lbs/day
Ethylbenzene	1.96E+05 ug/l	2.46E+03 lbs/day
Fluoranthene	2.51E+03 ug/l	3.14E+01 lbs/day
4-Chlorophenyl phenyl ether		
4-Bromophenyl phenyl ether		
Bis(2-chloroisopropyl) ether	1.15E+06 ug/l	1.44E+04 lbs/day
Bis(2-chloroethoxy) methane		
Methylene chloride (HM)	1.08E+04 ug/l	1.36E+02 lbs/day
Methyl chloride (HM)		
Methyl bromide (HM)		
Bromoform (HM)	2.44E+03 ug/l	3.05E+01 lbs/day
Dichlorobromomethane(HM)	1.49E+02 ug/l	1.86E+00 lbs/day
Chlorodibromomethane (HM)	2.30E+02 ug/l	2.88E+00 lbs/day
Hexachlorocyclopentadiene	1.15E+05 ug/l	1.44E+03 lbs/day
Isophorone	4.06E+03 ug/l	5.08E+01 lbs/day
Naphthalene		
Nitrobenzene	1.29E+04 ug/l	1.61E+02 lbs/day
2-Nitrophenol		
4-Nitrophenol		
2,4-Dinitrophenol	9.48E+04 ug/l	1.19E+03 lbs/day
4,6-Dinitro-o-cresol	5.18E+03 ug/l	6.48E+01 lbs/day
N-Nitrosodimethylamine	5.49E+01 ug/l	6.86E-01 lbs/day
N-Nitrosodiphenylamine	1.08E+02 ug/l	1.36E+00 lbs/day
N-Nitrosodi-n-propylamine	9.48E+00 ug/l	1.19E-01 lbs/day
Pentachlorophenol	5.56E+01 ug/l	6.95E-01 lbs/day
Phenol	3.12E+07 ug/l	3.90E+05 lbs/day
Bis(2-ethylhexyl)phthalate	4.00E+01 ug/l	5.00E-01 lbs/day
Butyl benzyl phthalate	3.52E+04 ug/l	4.41E+02 lbs/day
Di-n-butyl phthalate	8.13E+04 ug/l	1.02E+03 lbs/day
Di-n-octyl phthlate		
Diethyl phthalate	8.13E+05 ug/l	1.02E+04 lbs/day
Dimethyl phthlate	1.96E+07 ug/l	2.46E+05 lbs/day
Benzo(a)anthracene (PAH)	2.10E-01 ug/l	2.63E-03 lbs/day
Benzo(a)pyrene (PAH)	2.10E-01 ug/l	2.63E-03 lbs/day
Benzo(b)fluoranthene (PAH)	2.10E-01 ug/l	2.63E-03 lbs/day
Benzo(k)fluoranthene (PAH)	2.10E-01 ug/l	2.63E-03 lbs/day
Chrysene (PAH)	2.10E-01 ug/l	2.63E-03 lbs/day
Acenaphthylene (PAH)		
Anthracene (PAH)		
Dibenzo(a,h)anthracene (PAH)	2.10E-01 ug/l	2.63E-03 lbs/day
Indeno(1,2,3-cd)pyrene (PAH)	2.10E-01 ug/l	2.63E-03 lbs/day

**Utah Division of Water Quality
Salt Lake City, Utah**

Pyrene (PAH)	7.45E+04 ug/l	9.32E+02 lbs/day
Tetrachloroethylene	6.03E+01 ug/l	7.54E-01 lbs/day
Toluene	1.35E+06 ug/l	1.69E+04 lbs/day
Trichloroethylene	5.49E+02 ug/l	6.86E+00 lbs/day
Vinyl chloride	3.56E+03 ug/l	4.45E+01 lbs/day

Pesticides

Aldrin	9.48E-04 ug/l	1.19E-05 lbs/day
Dieldrin	9.48E-04 ug/l	1.19E-05 lbs/day
Chlordane	4.00E-03 ug/l	5.00E-05 lbs/day
4,4'-DDT	4.00E-03 ug/l	5.00E-05 lbs/day
4,4'-DDE	4.00E-03 ug/l	5.00E-05 lbs/day
4,4'-DDD	5.69E-03 ug/l	7.12E-05 lbs/day
alpha-Endosulfan	1.35E+01 ug/l	1.69E-01 lbs/day
beta-Endosulfan	1.35E+01 ug/l	1.69E-01 lbs/day
Endosulfan sulfate	1.35E+01 ug/l	1.69E-01 lbs/day
Endrin	5.49E+00 ug/l	6.86E-02 lbs/day
Endrin aldehyde	5.49E+00 ug/l	6.86E-02 lbs/day
Heptachlor	1.42E-03 ug/l	1.78E-05 lbs/day
Heptachlor epoxide		

PCB's

PCB 1242 (Arochlor 1242)	3.05E-04 ug/l	3.81E-06 lbs/day
PCB-1254 (Arochlor 1254)	3.05E-04 ug/l	3.81E-06 lbs/day
PCB-1221 (Arochlor 1221)	3.05E-04 ug/l	3.81E-06 lbs/day
PCB-1232 (Arochlor 1232)	3.05E-04 ug/l	3.81E-06 lbs/day
PCB-1248 (Arochlor 1248)	3.05E-04 ug/l	3.81E-06 lbs/day
PCB-1260 (Arochlor 1260)	3.05E-04 ug/l	3.81E-06 lbs/day
PCB-1016 (Arochlor 1016)	3.05E-04 ug/l	3.81E-06 lbs/day

Pesticide

Toxaphene	5.08E-03 ug/l	6.36E-05 lbs/day
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Metals

Antimony	ug/l	lbs/day
Arsenic	ug/l	lbs/day
Asbestos	ug/l	lbs/day
Beryllium		
Cadmium		
Chromium (III)		
Chromium (VI)		
Copper	ug/l	lbs/day
Cyanide	ug/l	lbs/day
Lead		
Mercury	ug/l	lbs/day
Nickel	ug/l	lbs/day
Selenium		
Silver		
Thallium	ug/l	lbs/day
Zinc		

**Utah Division of Water Quality
Salt Lake City, Utah**

Dioxin
Dioxin (2,3,7,8-TCDD) 9.48E-08 ug/l 1.19E-09 lbs/day

**Metals Effluent Limitations for Protection of All Beneficial Uses
Based upon Water Quality Standards and Toxics Rule**

	Class 4 Acute Agricultural ug/l	Class 3 Acute Aquatic Wildlife ug/l	Acute Toxics Drinking Water Source ug/l	Acute Toxics Wildlife ug/l	1C Acute Health Criteria ug/l	Acute Most Stringent ug/l	Class 3 Chronic Aquatic Wildlife ug/l
Aluminum		2908.6				2908.6	N/A
Antimony				29130.9		29130.9	
Arsenic	677.5	1319.4			0.0	677.5	1282.6
Barium						0.0	
Beryllium						0.0	
Cadmium	67.3	48.8			0.0	48.8	6.2
Chromium (III)		29340.0			0.0	29340.0	2439.6
Chromium (VI)	672.9	50.7			0.0	50.72	51.57
Copper	1350.3	280.3				280.3	276.9
Cyanide		85.5	1490415.9			85.5	35.2
Iron		3883.7				3883.7	
Lead	672.9	2936.2			0.0	672.9	195.0
Mercury		9.33		1.02	0.0	1.02	0.081
Nickel		8002.0		31163.2		8002.0	1546.3
Selenium	329.5	73.2			0.0	73.2	22.0
Silver		297.6			0.0	297.6	
Thallium				42.7		42.7	
Zinc		2048.5				2048.5	3570.0
Boron	5081.0					5081.0	

**Summary Effluent Limitations for Metals [Wasteload Allocation, TMDL]
[If Acute is more stringent than Chronic, then the Chronic takes on the Acute value.]**

	WLA Acute ug/l	WLA Chronic ug/l	
Aluminum	2908.6	N/A	
Antimony	29130.86		
Arsenic	677.5	1282.6	Acute Controls
Asbestos	0.00E+00		
Barium			
Beryllium			
Cadmium	48.8	6.2	
Chromium (III)	29340.0	2440	
Chromium (VI)	50.7	51.6	Acute Controls
Copper	280.3	276.9	

**Utah Division of Water Quality
Salt Lake City, Utah**

Cyanide	85.5	35.2	
Iron	3883.7		
Lead	672.9	195.0	
Mercury	1.016	0.081	
Nickel	8002.0	1546	
Selenium	73.2	22.0	
Silver	297.6	N/A	
Thallium	42.7		
Zinc	2048.5	3570.0	Acute Controls
Boron	5080.96		

Other Effluent Limitations are based upon R317-1.

E. coli 126.0 organisms per 100 ml

X. Antidegradation Considerations

The Utah Antidegradation Policy allows for degradation of existing quality where it is determined that such lowering of water quality is necessary to accommodate important economic or social development in the area in which the waters are protected [R317-2-3]. It has been determined that certain chemical parameters introduced by this discharge will cause an increase of the concentration of said parameters in the receiving waters. Under no conditions will the increase in concentration be allowed to interfere with existing instream water uses.

The antidegradation rules and procedures allow for modification of effluent limits less than those based strictly upon mass balance equations utilizing 100% of the assimilative capacity of the receiving water. Additional factors include considerations for "Blue-ribbon" fisheries, special recreational areas, threatened and endangered species, and drinking water sources.

An Antidegradation Level I Review was conducted on this discharge and its effect on the receiving water. Based upon that review, it has been determined that an Antidegradation Level II Review is not required. Basic renewal, no increase in effluent flow or concentration.

XI. Colorado River Salinity Forum Considerations

Discharges in the Colorado River Basin are required to have their discharge at a TDS loading of less than 1.00 tons/day unless certain exemptions apply. Refer to the Forum's Guidelines for additional information allowing for an exceedence of this value.

XII. Summary Comments

The mathematical modeling and best professional judgement indicate that violations of receiving water beneficial uses with their associated water quality standards, including important downstream segments, will not occur for the evaluated parameters of concern as discussed above if the effluent limitations indicated above are met.

**Utah Division of Water Quality
Salt Lake City, Utah**

XIII. Notice of UPDES Requirement

This Addendum to the Statement of Basis does not authorize any entity or party to discharge to the waters of the State of Utah. That authority is granted through a UPDES permit issued by the Utah Division of Water Quality. The numbers presented here may be changed as a function of other factors. Dischargers are strongly urged to contact the Permits Section for further information. Permit writers may utilize other information to adjust these limits and/or to determine other limits based upon best available technology and other considerations provided that the values in this wasteload analysis [TMDL] are not compromised. See special provisions in Utah Water Quality Standards for adjustments in the Total Dissolved Solids values based upon background concentration.

**Utah Division of Water Quality
Salt Lake City, Utah**

Antidegradation Review

An antidegradation review (ADR) was conducted to determine whether the proposed activity complies with the applicable antidegradation requirements for receiving waters that may be affected. The Level I ADR evaluated the criteria of R317-2-3.5(b) and determined that the proposed discharge will not require a Level II Antidegradation Review. The proposed permit is a simple renewal. No increase in effluent flow or concentration.

State ID	Monitoring Period	Outfall	Unit	Monitoring	Parameter	Reported Measure	Reported Measure
				Location		30DA AVG (mg/L)	MX WK AV (mg/L)
UT0000035	3/31/2011	001A	mg/L	1	BOD, 5-day, 20 deg. C	13	13
	6/30/2011		mg/L	1		10	10
	9/30/2011		mg/L	1		21	21
	12/31/2011		mg/L	1		25	25
	3/31/2012		mg/L	1		23.3	28
	6/30/2012		mg/L	1		18.67	23
	9/30/2012		mg/L	1		22.75	27
	11/30/2012		mg/L	1		22.67	24
	12/31/2012		mg/L	1		22.67	24
	1/31/2013		mg/L	1		24	26
	2/28/2013		mg/L	1		24	22
	3/31/2013		mg/L	1		18	18
	4/30/2013		mg/L	1		19	22
	5/31/2013		mg/L	1		19	21
	6/30/2013		mg/L	1		19.5	23
	7/31/2013		mg/L	1		19.5	22
	8/31/2013		mg/L	1		22	22
	9/30/2013		mg/L	1		25.5	28
	10/31/2013		mg/L	1		27	27
	11/30/2013		mg/L	1		26	30
	12/31/2013		mg/L	1		30	30
	1/31/2014		mg/L	1		25	25
	2/28/2014		mg/L	1		28	28
	3/31/2014		mg/L	1		25	25
	4/30/2014		mg/L	1		Not Received	Not Received

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State ID	Monitoring Period	Outfall	Unit	Monitoring	Parameter	Reported Measure	Reported Measure
				Location		30DA AVG (MGD)	MX30DAAV (MGD)
UT0000035	3/31/2011	001A	MGD	1	Flow, in conduit or thru treatment plant	0.51	0.57
	6/30/2011		MGD	1		0.64	0.69
	9/30/2011		MGD	1		1.21	1.28
	12/31/2011		MGD	1		1.78	1.78
	3/31/2012		MGD	1		1.8	1.98
	6/30/2012		MGD	1		1.69	1.81
	9/30/2012		MGD	1		1.67	1.73
	11/30/2012		MGD	1		1.46	1.47
	12/31/2012		MGD	1		1.46	1.47
	1/31/2013		MGD	1		1.4	1.41
	2/28/2013		MGD	1		1.75	1.75
	3/31/2013		MGD	1		1.46	1.46
	4/30/2013		MGD	1		1.4	1.4
	5/31/2013		MGD	1		1.4	1.4
	6/30/2013		MGD	1		1.09	1.09
	7/31/2013		MGD	1		1.42	1.42
	8/31/2013		MGD	1		1.31	1.31
	9/30/2013		MGD	1		1.17	1.17
	10/31/2013		MGD	1		1	1
	11/30/2013		MGD	1		1.45	1.45
	12/31/2013		MGD	1		1.18	1.18
	1/31/2014		MGD	1		1.17	1.17
	2/28/2014		MGD	1		1	1
	3/31/2014		MGD	1		1.26	1.26
	4/30/2014		MGD	1		Not Received	Not Received

State ID	Monitoring Period	Outfall	Unit	Monitoring	Parameter	Reported Measure
				Location		DAILY MX (Y=1;N=0)
UT0000035	3/31/2011	001A	Y=1;N=0	1	Oil and grease visual	0
	6/30/2011		Y=1;N=0	1		0
	9/30/2011		Y=1;N=0	1		0
	12/31/2011		Y=1;N=0	1		0
	3/31/2012		Y=1;N=0	1		0
	6/30/2012		Y=1;N=0	1		0
	9/30/2012		Y=1;N=0	1		0
	11/30/2012		Y=1;N=0	1		0
	12/31/2012		Y=1;N=0	1		0
	1/31/2013		Y=1;N=0	1		0
	2/28/2013		Y=1;N=0	1		0
	3/31/2013		Y=1;N=0	1		0
	4/30/2013		Y=1;N=0	1		0
	5/31/2013		Y=1;N=0	1		0
	6/30/2013		Y=1;N=0	1		0
	7/31/2013		Y=1;N=0	1		0
	8/31/2013		Y=1;N=0	1		0
	9/30/2013		Y=1;N=0	1		0
	10/31/2013		Y=1;N=0	1		0
	11/30/2013		Y=1;N=0	1		0
	12/31/2013		Y=1;N=0	1		0
	1/31/2014		Y=1;N=0	1		0
	2/28/2014		Y=1;N=0	1		0
	3/31/2014		Y=1;N=0	1		0
	4/30/2014		Y=1;N=0	1		Not Received

Golden State Operating, LLC -
 ASHLEY VALLEY FACILITY
 UT0000035

DMR Data Listing
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State ID	Monitoring Period	Outfall	Unit	Monitoring	Parameter	Reported Measure
				Location		DAILY MX (mg/L)
UT0000035	3/31/2011	001A	mg/L	1	Oil & Grease	4.02
	6/30/2011		mg/L	1		<3
	9/30/2011		mg/L	1		7.22
	12/31/2011		mg/L	1		6.95
	3/31/2012		mg/L	1		8.4
	6/30/2012		mg/L	1		6.42
	9/30/2012		mg/L	1		7.13
	11/30/2012		mg/L	1		7.69
	12/31/2012		mg/L	1		7.69
	1/31/2013		mg/L	1		7.81
	2/28/2013		mg/L	1		7.27
	3/31/2013		mg/L	1		5.65
	4/30/2013		mg/L	1		7.62
	5/31/2013		mg/L	1		8.3
	6/30/2013		mg/L	1		7.78
	7/31/2013		mg/L	1		8.56
	8/31/2013		mg/L	1		8.27
	9/30/2013		mg/L	1		7.22
	10/31/2013		mg/L	1		7.6
	11/30/2013		mg/L	1		8.58
	12/31/2013		mg/L	1		6.8
	1/31/2014		mg/L	1		6.94
	2/28/2014		mg/L	1		8.03
	3/31/2014		mg/L	1		9.75
	4/30/2014		mg/L	1		Not Received

State ID	Monitoring Period	Outfall	Unit	Monitoring	Parameter	Reported Measure	Reported Measure
				Location		DAILY MN (SU)	DAILY MX (SU)
UT0000035	3/31/2011	001A	SU	1	pH	7.84	7.84
	6/30/2011		SU	1		8.19	8.19
	9/30/2011		SU	1		8.15	8.15
	12/31/2011		SU	1		7.78	7.78
	3/31/2012		SU	1		7.68	7.68
	6/30/2012		SU	1		7.65	7.65
	9/30/2012		SU	1		7.68	7.68
	11/30/2012		SU	1		7.96	8.24
	12/31/2012		SU	1		7.96	8.24
	1/31/2013		SU	1		7.6	8.11
	2/28/2013		SU	1		7.58	7.79
	3/31/2013		SU	1		7.57	7.58
	4/30/2013		SU	1		7.69	7.69
	5/31/2013		SU	1		7.58	7.6
	6/30/2013		SU	1		7.54	7.58
	7/31/2013		SU	1		7.55	7.6
	8/31/2013		SU	1		7.79	7.86
	9/30/2013		SU	1		7.9	7.99
	10/31/2013		SU	1		7.92	7.95
	11/30/2013		SU	1		7.94	7.96
	12/31/2013		SU	1		7.81	7.93
	1/31/2014		SU	1		7.6	7.67
	2/28/2014		SU	1		7.6	7.7
	3/31/2014		SU	1		7.04	7.5
	4/30/2014		SU	1		Not Received	Not Received

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ASHLEY VALLEY FACILITY
UT0000035

DMR Data Listing
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State ID	Monitoring Period	Outfall	Unit	Monitoring	Parameter	Reported Measure
				Location		DAILY MX (mg/L)
UT0000035	3/31/2011	001A	mg/L	1	Solids, total dissolved	1260
	6/30/2011		mg/L	1		1270
	9/30/2011		mg/L	1		1250
	12/31/2011		mg/L	1		1280
	3/31/2012		mg/L	1		1380
	6/30/2012		mg/L	1		1270
	9/30/2012		mg/L	1		1180
	11/30/2012		mg/L	1		1230
	12/31/2012		mg/L	1		1230
	1/31/2013		mg/L	1		1185
	2/28/2013		mg/L	1		1240
	3/31/2013		mg/L	1		1320
	4/30/2013		mg/L	1		1180
	5/31/2013		mg/L	1		1255
	6/30/2013		mg/L	1		1180
	7/31/2013		mg/L	1		1,225
	8/31/2013		mg/L	1		1175
	9/30/2013		mg/L	1		1295
	10/31/2013		mg/L	1		1230
	11/30/2013		mg/L	1		1340
	12/31/2013		mg/L	1		1340
	1/31/2014		mg/L	1		1310
	2/28/2014		mg/L	1		1270
	3/31/2014		mg/L	1		1230
	4/30/2014		mg/L	1		Not Received

State ID	Monitoring Period	Outfall	Unit	Monitoring	Parameter	Reported Measure	Reported Measure
				Location		30DA AVG (mg/L)	MX WK AV (mg/L)
UT0000035	3/31/2011	001A	mg/L	1	Solids, total suspended	<3	<3
	6/30/2011		mg/L	1		<3	<3
	9/30/2011		mg/L	1		3	3
	12/31/2011		mg/L	1		<3	<3
	3/31/2012		mg/L	1		<3	<3
	6/30/2012		mg/L	1		<3	<3
	9/30/2012		mg/L	1		<3	<3
	11/30/2012		mg/L	1		<3	<3
	12/31/2012		mg/L	1		<3	<3
	1/31/2013		mg/L	1		4.1	5.2
	2/28/2013		mg/L	1		<3	<3
	3/31/2013		mg/L	1		<3	<3
	4/30/2013		mg/L	1		<3	<3
	5/31/2013		mg/L	1		<3	<3
	6/30/2013		mg/L	1		<3	<3
	7/31/2013		mg/L	1		<3	<3
	8/31/2013		mg/L	1		6.1	9.2
	9/30/2013		mg/L	1		3.1	3.2
	10/31/2013		mg/L	1		<3	<3
	11/30/2013		mg/L	1		<3	<3
	12/31/2013		mg/L	1		<3	<3
	1/31/2014		mg/L	1		<3	<3
	2/28/2014		mg/L	1		<3	<3
	3/31/2014		mg/L	1		<3	<3
	4/30/2014		mg/L	1		Not Received	Not Received

